THE FOUNDRY

A TRADE JOURNAL

DEVOTED TO THE INTERESTS OF THE WHOLE FOUNDRY BUSINESS

JANUARY, 1896.

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Published Monthly by THE FOUNDRY PUBLISHING CO.

DETROIT, MICH.

A FACING and Blacking to be satisfactory for all kinds and weights of castings, that can be shaken on the mold and be slicked nicely, or when mixed with water will make a good core wash, that can be used for dry sand or loam work, stand the heat and weight of molten metal whether poured hot, slow or fast, and not burn off, wash or run and will peel clean from the casting, is a Facing and Blacking that we think should interest every foundryman and molder living.

Just such a Facing and Blacking is RADIANT, and furthermore, we guarantee it to be so and will take it back and refund the price if it is not. WHAT MORE CAN WE OFFER? Radiant Facing is sold entirely on its merits and nothing else whatever has had anything to do with the extraordinary success of this Facing and Blacking. We have had some foundrymen tell us that it is undoubtedly the best general Facing and Blacking they ever used, but that they thought the price was too high. Is 2¼ cents per pound too high for the best Facing and Blacking on earth? We have noticed that these same people will buy Plumbago or Silver Lead at twice and more the price and never complain. Plumbago or Silver Lead are all right. We sell them, and would like to sell a good deal more of them; but there are objections to their use in the foundry doing general work that are overcome by the use of Radiant Facing and Blacking. How many complaints we hear about the hardening of

the surface of castings? There is nothing that will harden the surface of the casting sooner or more effectually than Plumbago or Silver Lead. We grant that Plumbago or Silver Lead makes a beautiful mold and a pretty (?) bright looking casting; but the question is whether this color or a casting is more satisfactory than a dark blue steel color such as the Radiant Facing and Blacking gives it? Radiant Facing and Blacking will not harden the surface of the casting. It can be shaken on the mold, through a bag, on parts that cannot be reached with a tool to slick it, and the facing will stick and peel clean.

The whole matter is that Radiant Facing and Blacking is the very best, most economical and satisfactory Facing and Blacking for the general jobbing foundry. There is no question about this and if you have any doubts about it, send for a barrel subject to approval. Our guarantee is that it will do everything we have stated above, otherwise you need not keep it and we will pay the freight.

The J. D. Smith Foundry Supply Co.

Manufacturers of Foundry Facings, Blackings, Foundry Supplies, and Refiners of Plumbago.

Cincinnati, Ohio, U. S. A.

A little history.

IT was away back in 1875 that the firm S. Obermayer & Co. was organized to carry on a foundry supply business in the city of Cincinnati, with Mr. S. Obermayer, then in his 28th year as its manager. It was a small affair whose entire yearly capacity was almost the same as the weekly product of the present company.

Although but 21 years ago, the foundry business was in a crude condition compared to the scientific nicety in which we find it in 1896. Foundrymen were but beginning to appreciate the value of a superior article of facings.

The demand thus created acted as a stimulus to this young concern and as a result of much research and continuous experimenting, the superior quality of their product was rapidly recognized by foundrymen generally, many of whom have been continuously using their goods ever since. That the popularity of the Obermayer Facings and the success of the concern should have attracted rivalry and imitators has not been considered as being otherwise than a compliment by those who, at various times, have had charge of its affairs, and when its competitors continually offer facings "as good as Obermayer's," we never protest. We know that experience alone teaches in such matters.

During these 21 years, we have been continually adding to our line until now we manufacture or sell direct, everything a foundryman needs, but metal and fuel. Our large experience and volume of business, places us in a position where we can always guarantee satisfaction and our thousands of customers, many in foreign countries, will bear witness to the pleasant relations existing at all times between this concern and its branches on the one hand, and its patrons on the other.

If you are not satisfied with the goods you are using or are in the market for anything for your foundry, write us.

No trouble to answer letters.

THE S. OBERMAYER CO.,

CINCINNATI, O. (MAIN OFFICE)

CHICAGO, ILL.
LARIMER, PA.

ESTABLISHED 1855.

J. W. PAXSON J. K. BOUGHER
HOWARD EVANS H. M. BOUGHER

This may give You an Idea!

HOW really few people there are after all who appreciate the extent of the foundry business in this country or the multiplicity of interests involved therein. Take for instance the subject of Foundry Supplies and Equipments, of which we are the acknowledged largest dealers on the face of the earth. In order to fill the requirements of our trade, we operate steadily all the year round (night and day most of the time) the following mills on different work as follows:

Quaker City Mills, Phila, Pa.—XX Colombo Plumbago, East India Plumbago, Silver Lead, IXL Lead, XX Mineral, Premium Return, Banner Fire Proof, German Lead, Mineral Lead.

Lehigh Mills, Lehighton, Pa.—Pipe Blacking, Car Wheel Mineral Facing, Mineral Facing, Core Wash Facing.

Sea Coal Mills, Irwin, Westmoreland Co., Pa.—Sea Coal Facing, Bituminous Facing, Carbon Facing, Coke Facing, Charcoal Facing.

Annex Mills, Phila, Pa.—Anthracite Facing, Lehigh Facing, Charcoal Facing, Talc Facing, Soapstone Facing, Core Compound.

Welsh Mountain Mills and Quarry, Honey Brook, Pa.—Ground Silica Rock, Ground Ganister, Silica Clay, Kaolin, Steel Mould Wash, Furnace Bottom Sand.

In the matter of Foundry Equipments we Fill Orders Promptly for such things as

Cupolas, Cupola Lining, Blowers, Ladles, Core Ovens, Iron Flasks, Snap Flasks, Rumblers, Brass, Furnaces, etc.

Our line of Sands is the Largest and Most Complete to be found and consists of any grade of

Moulding Sand, Core Sand, Steel Sand, Clay, Gravel, Fire Sand, Mica Sand, Fire Stone etc.

In addition to all these, our large Foundry Supply Factory is kept running full handed making

Riddles, Sand Sifters, Casting Brushes, Bristle Brushes, Metallic Letters, Moulders' Tools, Bellows, Wire Brooms, Flue Brushes, etc.

As we make all we sell, we guarantee every article.

J. W. PAXSON & CO.,

PHILADELPHIA, PA.

McCULLOUGH DALZELL COMPANY
MANUFACTURERS OF
CRUCIBLES · STOPPERS
AND ALL ARTICLES
CONTAINING
PLUMBAGO
PITTSBURG, PA.
U.S.A.

P. G. COCHRAN, Pres. JOHN H. WURTZ, Secretary
J. R. LAUGHREY, Treas. J. S. NEWMYER, Mgr.

Washington Coal & Coke Co

(CAPITAL PAID-UP $250,000.)

MANUFACTURERS OF

HIGH GRADE COKE

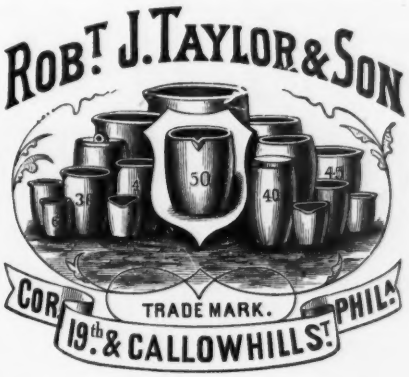
We Make a specialty of 72 Hour
Foundry Coke.

N. P. HYNDMAN, Sales Agent,

Room 8, Conestoga Building, 7 Wood St.

General Office, DAWSON, PA. PITTSBURG, PA.

Crucible.



Crucible

Dipper.

Jewelers'.

Stirrers.

Cover.

Cover.

Stopper.

Crucibles

For melting STEEL, BRASS, COPPER, GOLD AND ALL OTHER METALS. We are the only PRACTICAL MEN in our business and we work strictly by CHEMICAL ANALYSIS; our CRUCIBLES will be found UNIFORM and RELIABLE at all times; they are well known all over this country and also Europe; send us a trial order and we will secure you as a customer. Also FINE GRAPHITE for LUBRICATING PURPOSES, for the devolopement of High Speed and Great Power. Our GRAPHITE is the purest in the market as Analysis will prove.

ROBT. J. TAYLOR & SON,

1900 to 1916
CALLOW HILL STREET, PHILADELPHIA, PA.

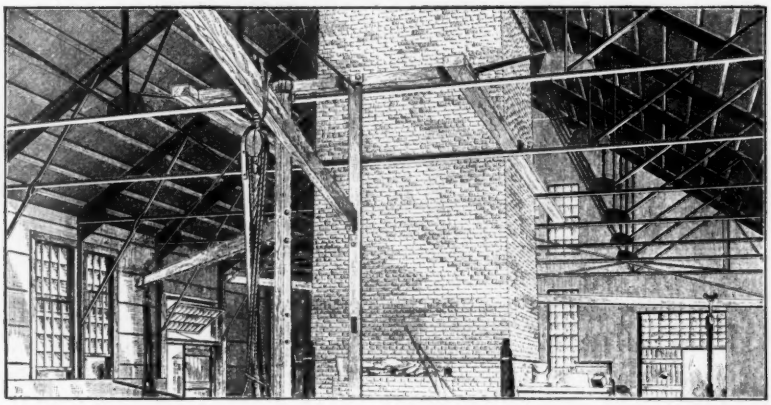
CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

Iron and Steel Bridges, Roofs and Buildings.



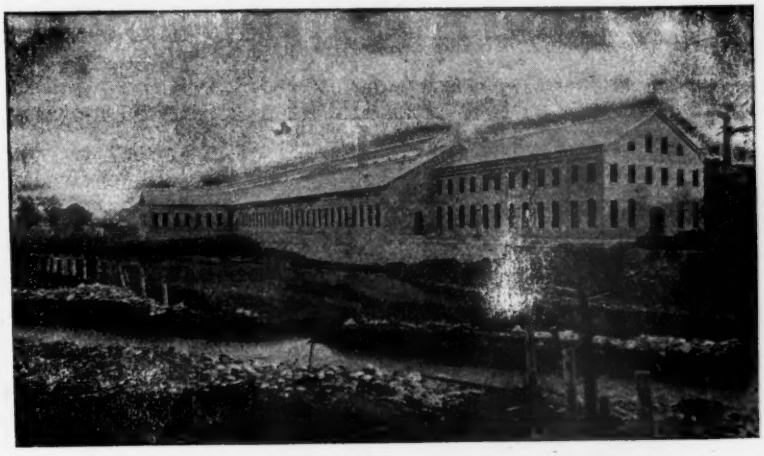
The above illustration is taken direct from a photograph, and shows the interior construction of an iron casting shop designed and built by us for the Waterbury Brass Company, at Waterbury, Conn. The building is 52 feet in width by 110 feet in length, and built entirely of iron; that is, iron sides and iron roof. The danger from fire in a brass casting shop is very great, and a construction of this kind eliminates this danger entirely.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

Wrought Iron Bridge Co.,

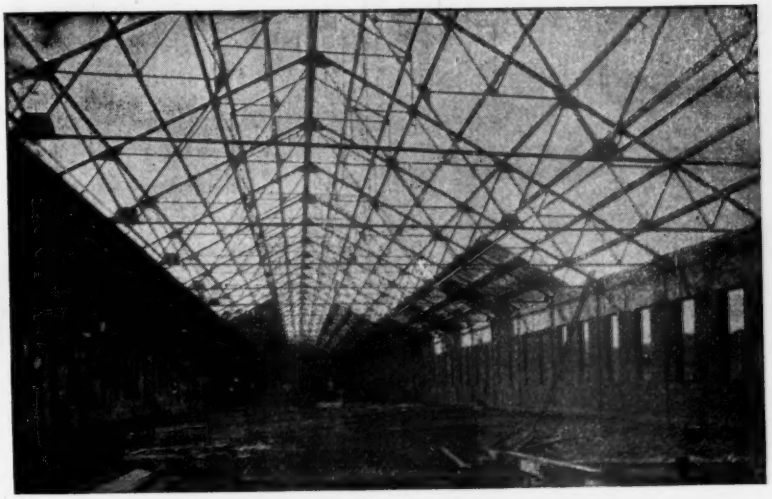
DESIGNERS AND BUILDERS IN
IRON AND STEEL
FIRE PROOF BUILDINGS



FOUNDRIES, MACHINE SHOPS
—FOR—
ETC., ETC.

Exterior of Foundry of Warder, Bushnell & Glessner Co., Springfield, Ohio.

Traveling and Jib Cranes for handling
Heavy Castings and Machinery.



Buildings Designed for Special
Requirements.

Interior Foundry Building of Warder, Bushnell & Glessner Co., Springfield, Ohio.

The roof of this building was erected by the Wrought Iron Bridge Co., Canton, Ohio, and consists of steel trusses supporting wooden purlins to which matched and dressed sheeting is nailed for slating. Trusses being 18 ft. above the floor, the wood work of roof is out of danger from fire, while the cover being of slate a suitable cornice to protect the overhanging of roof from flying sparks, or heat from the burning of neighboring buildings, renders this structure absolutely fire proof, Windows are set in the sides of ventilator throughout its entire length, so that ample light and ventilation is insured.

Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

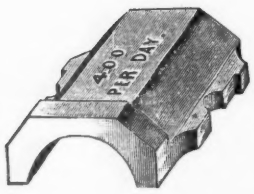
CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

136 Liberty St., NEW YORK.

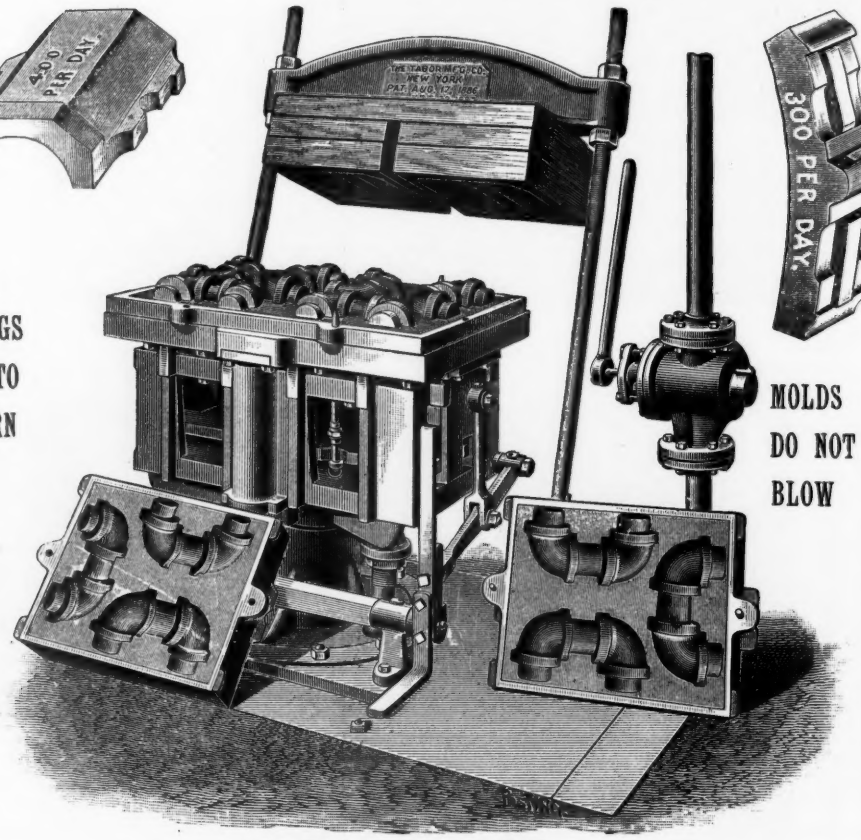
ONE MAN'S WORK

—WITH THE—

TABOR AUTOMATIC MOLDING MACHINE



POURS CASTINGS TRUE TO PATTERN



MOLDS DO NOT BLOW

DUPLEX MACHINE.

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

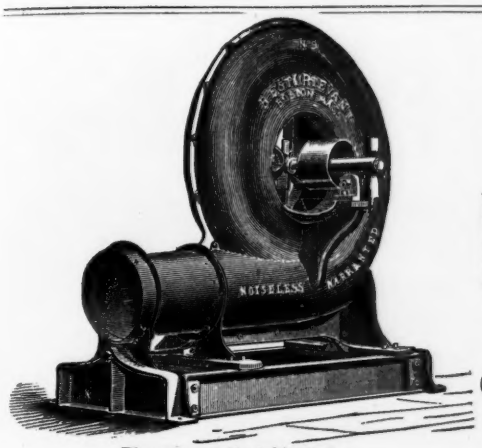
The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth N. J., and see the machines in operation.

The Tabor Manufacturing Co.

39 Cortlandt Street,

NEW YORK, - - - N. Y.



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

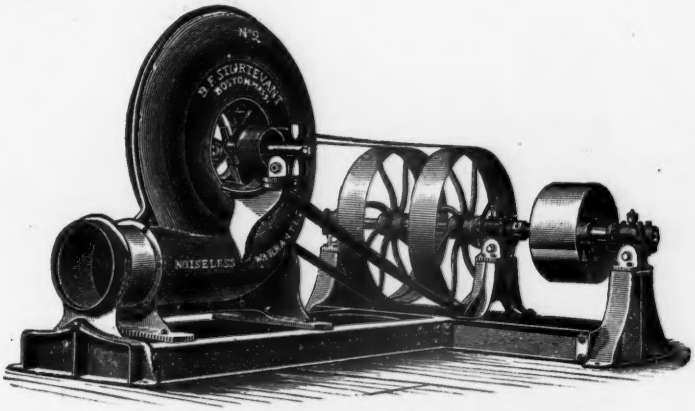
—FOR—

Cupola Furnaces and Forge Fires.

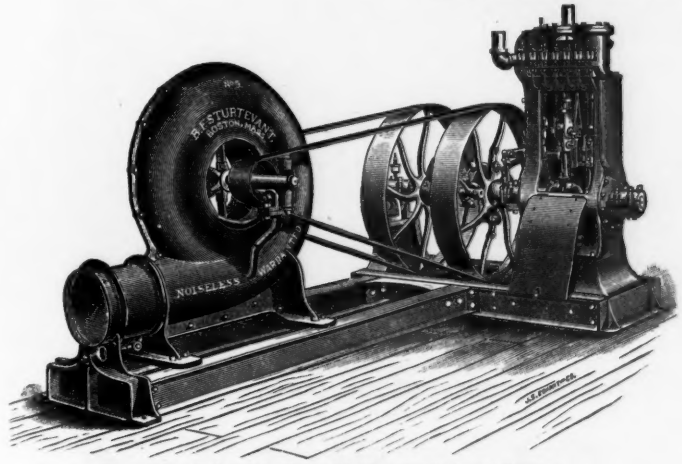
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

B. F. STURTEVANT CO.,

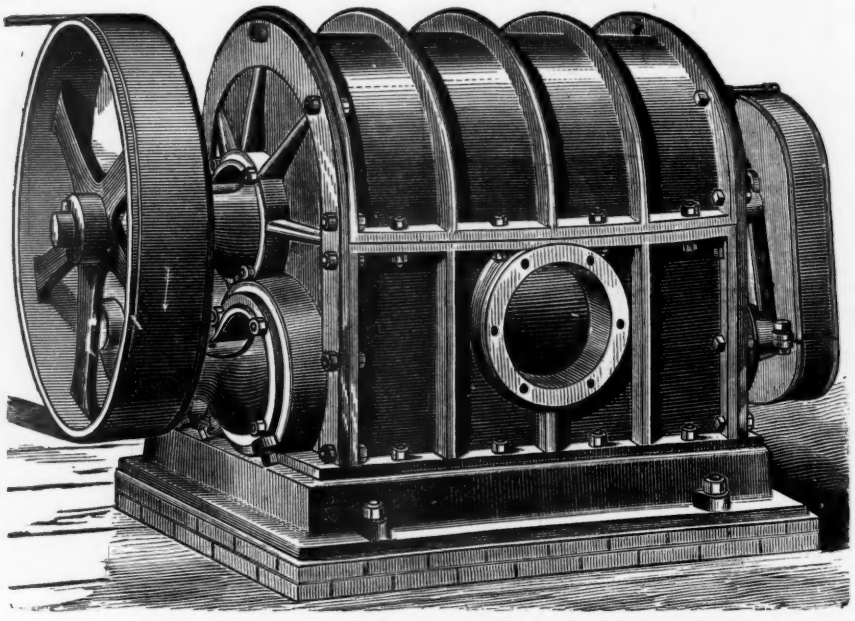
BOSTON, MASS.

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

The Baker Rotary Pressure Blower

ONLY ONE BELT IS REQUIRED TO DRIVE THE LARGEST BLOWER.



The Best POSITIVE PRESSURE BLOWER for IRON FOUNDRY CUPOLAS, Pneumatic Tubes, Water Gas Works, Smelting Silver, Lead, or Copper Ores, Sand Blast, Forge or Knobling Fires, Ventilating Mines or Tunnels or any other purpose requiring a POSITIVE BLAST OR EXHAUST.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.

INDUSTRIAL DEPARTMENT.

Burlington Route

Chicago, Burlington & Quincy R. R.
Chicago, Burlington & Northern R. R.
Burlington & Missouri River R. R. in Neb.
Hannibal & St. Joseph R. R.
Kansas City, St. Joseph & Council Bluffs R. R.
St. Louis, Keokuk & Northwestern R. R.
Chicago, Burlington & Kansas City Ry.

Over 7,000 Miles of Railroad Under One Management.

MANUFACTURERS contemplating the removal of their plants or the building of branch ones in the West are urgently requested to communicate with the undersigned.

OPPORTUNITIES, RESOURCES, ASSISTANCE.—THE BURLINGTON ROUTE reaches with its own line nearly every place of note in ILLINOIS, IOWA, MINNESOTA, MISSOURI, NEBRASKA, KANSAS, DAKOTA, WYOMING, COLORADO, and has direct connections to every point in America.

EVERY CONCEIVABLE RESOURCE in the shape of RAW MATERIAL, such as IRON ORE, COAL, COPPER, ZINC, TIN, GOLD and SILVER and OTHER METALS; thousands upon thousands of miles of forests, containing almost unlimited quantities of HARD and SOFT WOODS; CLAYS OF ALL KINDS AND FOR EVERY PURPOSE; inexhaustable stone quarries of every description; immense quantities of TAN BARK, Flax Straw, in fact, everything that is found in the ground or above the ground can almost surely be found somewhere on the vast BURLINGTON ROUTE.

MANUFACTURERS OR OTHERS, desiring any information regarding Materials, Accessibility to Markets, Best Cities and Towns to locate in, what these places offer as inducements, etc., will do well to write for information.

There are more Manufacturing Industries located on the lines of THE BURLINGTON ROUTE than on any other railroad in the United States

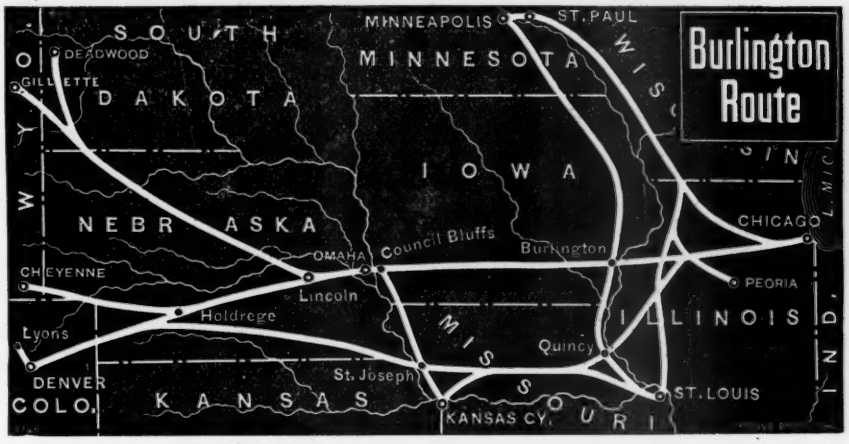
The interests of THE BURLINGTON ROUTE AND THOSE OF A MANUFACTURER OR LOCATOR UPON ITS LINES, ARE MUTUAL.

THE INDUSTRIAL DEPARTMENT of this road possesses the information you want. If not, it will procure it for you without any cost to you. This Department is as complete as any Railroad Industrial Department in the world. Will appreciate any correspondence requesting information, etc

This Department will make the work and worry of seeking a suitable and advantageous location easy for you.

For detailed information and for large county maps of the territory covered by the Burlington lines write to, or call upon **GEO. H. ROSS, Superintendent, INDUSTRIAL DEPARTMENT BURLINGTON ROUTE, General Offices, ADAMS AND FRANKLIN STREETS, CHICAGO.**

THE BEST RAILWAY



FROM CHICAGO AND ST. LOUIS TO

ST. PAUL, MINNEAPOLIS, OMAHA, KANSAS CITY, DENVER,

And all Points in Colorado, Utah and California,

P. S. EUSTIS, Gen'l Pass'r and Ticket Agent,
CHICAGO, ILLINOIS.

MAP OF THE UNITED STATES

A large, handsome Map of the United States, mounted and suitable for office or home use, is issed by the Burlington Route. Copies will be mailed to any address on receipt of twelve cents in postage by P. S. Eustis, Gen'l Pass. Agt., C. B. & Q. R. R., Chicago, Ill.

PLAYING CARDS

You can obtain a pack of best quality playing cards by sending fifteen cents in postage to P. S. Eustis Gen'l Pass. Agt., C. B. & Q. R. R., Chicago, Ill.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street. NEW YORK

Boston Office, 85 Water Street

HENRY H. ADAMS & CO.

(Incorporated)

PIG IRON

Sole Agents for the Celebrated "NORWAY," for combined Strength and Softness.

177 Broadway.
NEW YORK CITY, N. Y.

MATTHEW ADDY & CO.

CINCINNATI, ST. LOUIS,

Agencies,

Chicago, Detroit, New York,
Philadelphia.

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

DAYTON COAL & IRON CO.

(Limited.)

PIG IRON.

DAYTON, Tenn. CINCINNATI, Ohio.

F. A. GOODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

Detroit, Mich.

MACFARLANE & COMPANY,

Pig Iron and Coke,

LOUISVILLE, KY.

R. C. Cantelou, Manager

Chicago Office: 1531 MONADNOCK

PICKANDS, BROWN & CO.,

Manufacturers, Importers and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

ROGERS, BROWN & CO.

CINCINNATI, CHICAGO,

BUFFALO,

PHILADELPHIA, NEW YORK

ST. LOUIS

SLOSS IRON & STEEL CO.

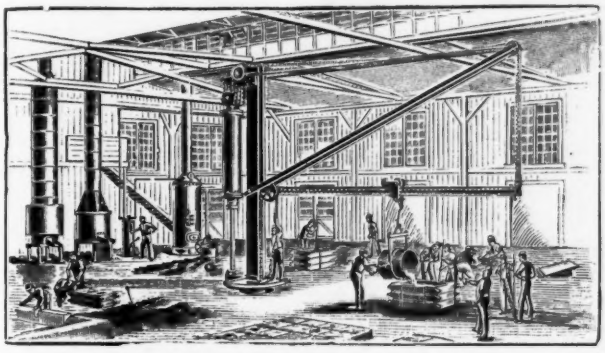
BIRMINGHAM, ALA.

SLOSS PIG IRON

D. L. Cobb, Sales Agent

1145 Monadnock Block, CHICAGO, ILL

Our Starter for 1896. Who's Next?



5-ton Steam-Hydraulic Crane in a Foundry.

Speaking of Cranes, now there's Rob't. Wetherill & Co. of Chester, Pa., the celebrated, Corliss engine builders; one of the best plants in the country. Besides, they used to be the head of the Standard Steel Casting Co., at Thurlow, and made it a success. They ought to know a thing or two about cranes if anybody does.

Like you and lots of others, they look over these cards of ours week after week, and as these Wetherills are keen, wide-awake, smart business men, they of course investigated a Crane that make such claims and which had such wonderful indorsements.

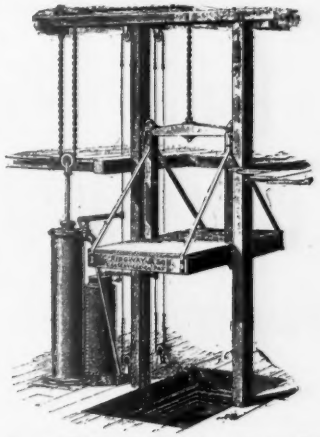
They went up to Philadelphia, where lots of the cranes are at work, to see what they could see. They called at The Grays Ferry Foundry & Boiler Co., where we had recently put in cranes, and saw them hard at work in this, the busiest foundry in the city. Then they went up to Blankley Bros., another live foundry where all the partners are a family of sand pounders, and saw the crane there rattling out heavy work in great shape. These were enough. They went home and at once sent for Ridgway and—well, it was only that same old, old story,

"RIDGWAY, WHAT'S YOUR QUICKEST DELIVERY?"

And we begin the New Year by making another big concern happy. Congratulations! Thanks, awfully. And you, what are you going to do? Plug along in the same old way, waste hundreds of dollars in wages and growl at the hard times and the Democratic Administration because you don't make money like you think you ought? That's no way to do.

"PLEASE TAKE THE ELEVATOR!"

Does the business while your old rattle trap is getting a "move on."



Steam-Hydraulic Elevator. also made direct acting with cylinder under platform.

Craig Ridgway & Son,

COATESVILLE, PA.

JOHN J. SHIPHERD, Pres. W. RUSSELL, Vice-Pres. and Mgr.
L. C. SHIPHERD, Sec'y and Treas.

THE

Phoenix Iron Works Co.

The following is a letter which was sent to us unasked for and is a sample of many genuine indorsements which we receive very frequently.

OFFICE OF
BERT. L. BALDWIN, M. E.
CINCINNATI, O.

PHOENIX IRON WORKS CO.
CLEVELAND, OHIO.

GENTLEMEN—As you may remember, you furnished a 10 ton traveling Crane which was erected at the Cummingsville Generating Station for the Cincinnati Street Ry. Co. This crane was erected for the purpose of handling the heavy parts of the Railway Generators. The easy working of this crane was appreciated by the party, who had the contract for erecting the generator, who found that where it required eight men at the hoisting chain of one of our other cranes, it only required three at your crane, with both cranes handling the same load. All of the details on this crane are well worked out and substantial, so that I expect that it will continue to give us the best satisfaction.

Yours respectfully,
(Signed) BERT L. BALDWIN.

MANUFACTURERS

Hand, Steam, Belt, Hydraulic and Electric Cranes

FOR ALL PURPOSES.

Foundry Ladles, Chains, and General Machinery

WASON STREET.

CORRESPONDENCE SOLICITED.
WRITE FOR CATALOGUE.

CLEVELAND, OHIO.

Eastern Office: HARRY W. JENNINGS, Agt., Fulton and Cliff Sts. NEW YORK, N. Y.
New England Office: THE JOHN WALES CO., 139 and 141 High St. BOSTON, MASS
CHICAGO OFFICE, 1430 OLD COLONY BUILDING.

The Edw. P. Allis Co.

Milwaukee, Wis. have the largest foundry (exclusively for machinery castings,) in the United States. Its interior is shown by the following cut. . . . .

The daily melt is from 60 to 90 tons. All the heavy work is done under and handled by **THREE** thirty ton

Shaw Electric Traveling Cranes,

The first of which was put in operation in 1889, the second in 1891 and the third in 1893. Besides these, there are three more Shaw Cranes in the erecting and machine shops.

These Crane are Made Only by

THE SHAW ELECTRIC CRANE CO.

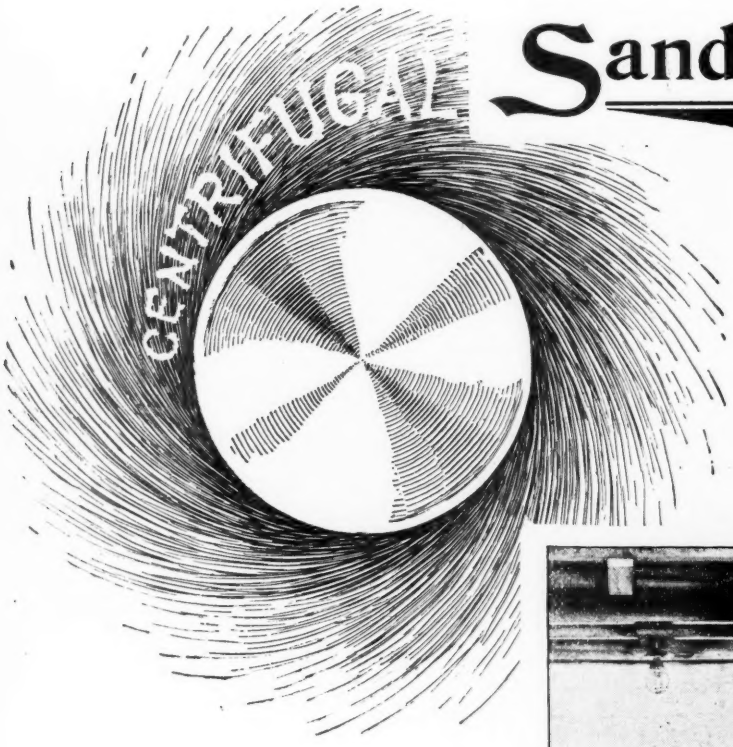
MUSKEGON, MICH.

——And Sold Only by——

Manning, Maxwell & Moore,

424 TELEPHONE BUILDING, PITTSBURG.

60 S. CANAL ST., CHICAGO, ILL. **111 LIBERTY ST., NEW YORK,**



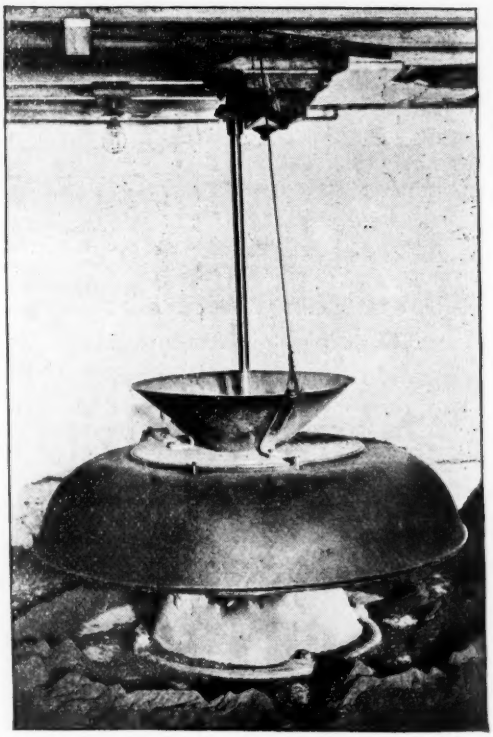
Sand Mixer

IT IS

EFFECTIVE
EXPEDITIOUS
ECONOMICAL

IT SAVES

TIME
LABOR
MONEY



A new, simple and practical method of **preparing Sand for Molds or Cores,** superseding the old time methods of drying and riddling. Damp Sand is in just the proper condition for working.

The saving in labor alone soon repays the cost of the apparatus.

☞NOTE.—We have used this new appliance in our foundry for more than two years with great satifaction; other large establishments have obtained machines from us, and we are now prepared to offer them to foundries and to give full information on application to . . .

William Sellers & Co., Incorp.

PHILADELPHIA.

Just Enough Wind

and at the right pressure for the best results is what you obtain with a

Roots' Positive Pressure Blower

OUR CATALOGUE is Interesting.
OUR TESTIMONIAL SHEET Convincing.

Write for Them

P. H. & F. M. Roots Co.,

Connersville, Indiana.

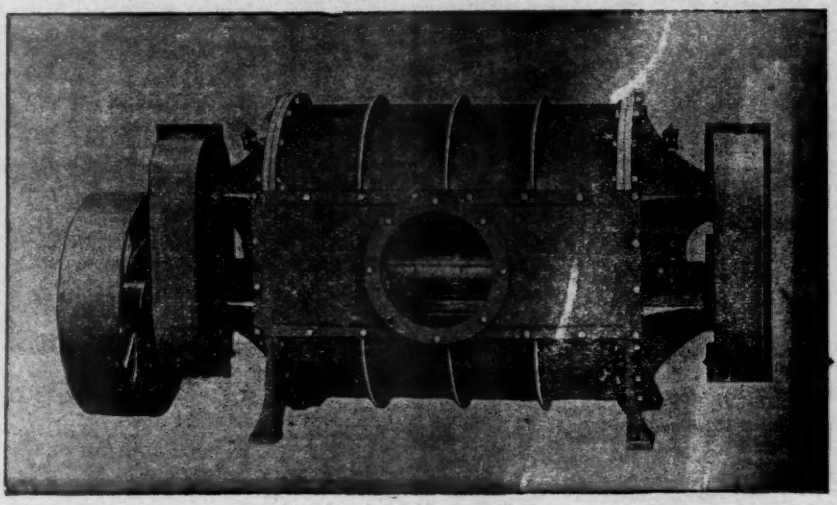
OVER

25,000

Roots' Positive Pressure Blowers

Have been put on the market.

—1859—



—1896—

They are Unequalled.

P. H. & F. M. ROOTS CO.,

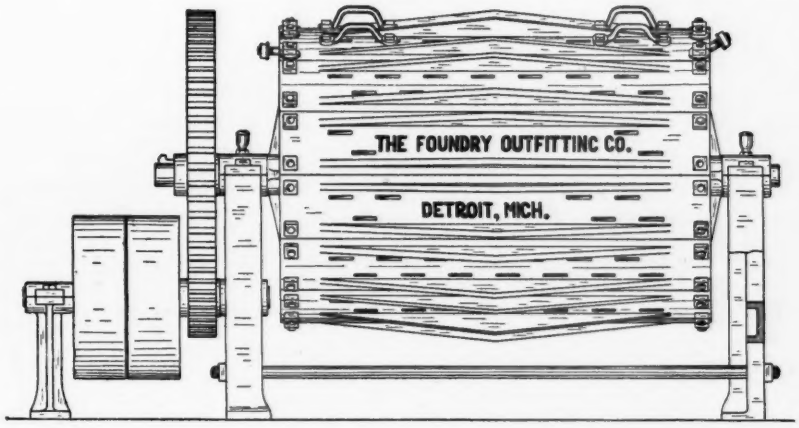
CONNERSVILLE, IND.

Cupola Furnaces
Blowers
Cranes
Compressors
Hoists
Elevators
Foundry and
Core Oven Cars
Ladles

Tumbling Mills

WE HAVE
36 DIFFERENT SIZES

CAN FURNISH ANY SIZE YOU WANT.
WRITE FOR PRICE.



Reservoirs
Tumbling Mills
Core Ovens
Sand Sifters
Brass Furnaces
Testing Machines
Trolley Tracks
Foundry Lights
Flasks
Fire Brick
Fire Clay
Molding Sand

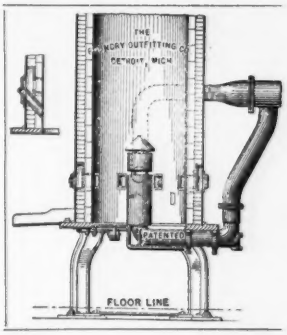
BETTER USE THE

CENTER BLAST CUPOLA!

IT WILL SAVE YOU
HUNDREDS OF DOLLARS
In Time, Fuel and Brick Lining, and Thousands in the Cheapening of your Mixture.

• • •

WE HAVE
"EVERYTHING USED IN A FOUNDRY."



The Foundry Outfitting Co. DETROIT, MICH.

Cranes **Cupolas**

A Good Ladle

Is a necessity in a good foundry. Better invest a little money in one than lose a lot by using a make-shift. Every size (30 pounds to 30 tons.)

Crane Ladles, Truck Ladles, Bull Ladles, Bottom Tap Ladles, Reservoir Ladles, Sulky Ladles, Hand Ladles. ALL KINDS.

Whiting Foundry Equipment Co.

1522 Monadnock Blk. CHICAGO.
Works, HARVEY, ILLS.

(Complete Foundry Plants. Use our Circulars.)

Air Hoists **Tumblers**

THE FOUNDRY

VOL. 7. DETROIT, MICH., JANUARY, 1896. No. 41

A Visit to the Works of Wm. Sellers & Co.

In the former papers we described the iron foundries with their electric traveling cranes and other interesting features, including the Vicars' mechanical stoker, which is now attracting much attention in Pittsburg and elsewhere, partly in consequence of recent city ordinances restricting the pollution of the atmosphere by smoke.

The brass foundry of Wm. Sellers & Co. is an unpretentious building of comparatively limited dimensions; it is devoted almost exclusively to the complicated work involved in the manufacture of injectors, which were introduced to America by this firm about 30 years ago.

A special testing laboratory was constructed, and elaborate experiments commenced and are still carried on, in which injectors of all kinds are subjected to every conceivable condition of ordinary service as well as to many other conditions which could only arise in cases of extraordinary accident.

The original scientific tests were so thorough that they have a well recognized and lasting interest and value, far exceeding the limitation of their original purpose, since they settled for all time hitherto obscure phenomena of this one-time paradoxical apparatus.

It would be impracticable to describe in our limited space the details or steam and water connections, gauges, meters, etc., used in these laboratory tests whereby the maximum height to which hot or cold water may be lifted, the capacity of the instruments, their ability to automatically re-start when the stream is cut off momentarily, and other varying data have been determined. Suffice it to say, that the gradual solution of these problems led to the evolution of the modern automatic re-starting injector, which is universally regarded as a triumph of mechanical skill. In the original "Giffard" injector it was necessary to perform several consecutive movements in order to start the machine, which was at best limited in scope, easily deranged and was re-started with difficulty. The modern injector has reduced the necessary movements to the simple opening of a cock or valve to set the apparatus at work, and closing it to stop work, the engineer then confidently relies upon the little machine to do the rest, not only under all ordinary conditions but even under extraordinary contingencies.

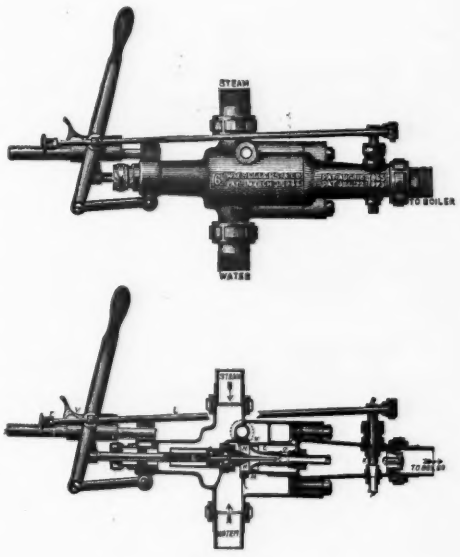


Fig. 1.

While the apparatus has been simplified to a wonderful degree in the manipulation, this has involved the elaboration of internal chambers in the injector to a corresponding degree, and this, in turn, has developed ingenuity and skill in designing patterns and cores, and in molding; all of which renders the construction of these molds exceedingly interesting to the founder, irrespective of the ultimate use to which the castings are de-

signed to be put, and we are not aware that any descriptions or illustrations of these molds, patterns or cores have heretofore appeared in print.

The cut (No. 1) shows the external appearance and internal construction of the first "self-adjusting injector of 1876," and the half-tone illustration (No. 2) shows the more recent "self-acting injector of 1887." This was made from a photograph of a complete apparatus after a portion of the shell had been cut away so that the interior chambers may be plainly seen.

Illustrations 3 and 4 were made from photographs of card patterns containing various parts of injectors, including the latest and simplest form of "re-starting injector" designed for both large and small stationary and traction engines, tug boats, etc.

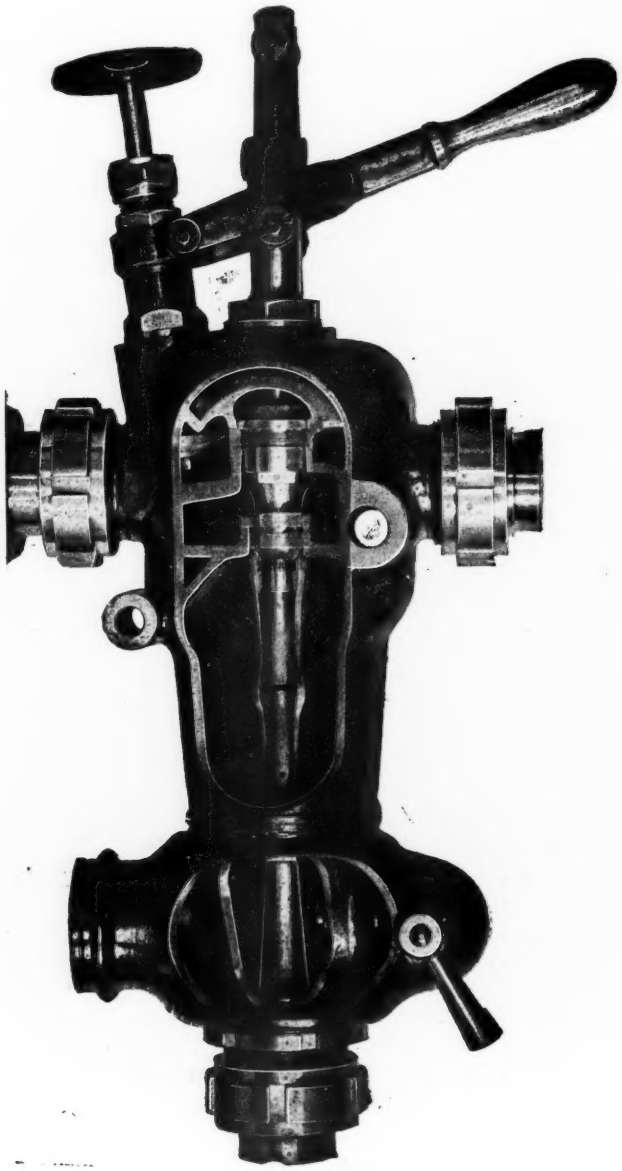


Fig. 2

Plate No. 4 shows a complete set of cores for a locomotive injector and several smaller cores.

As all parts of injectors are now made interchangeable, and as there are no less than eight, and in some cases thirteen, separate cores in these comparatively small molds, it is evident that there is little lee-way for crude or varying work.

The necessary degree of accuracy in such castings is secured by machine molding from finely finished metal patterns, many pieces being put upon one card.

The delicate cores are all made in iron core boxes which are highly finished by scraping, filing, and polishing.

Although this department is called "the brass foundry," this is a misnomer, since brass (as usually understood) is not melted here. All of the metal used is bronze. The

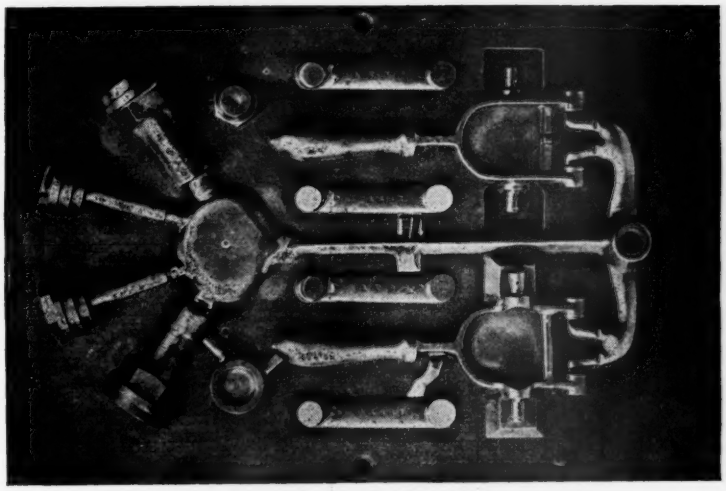


Fig. 3.

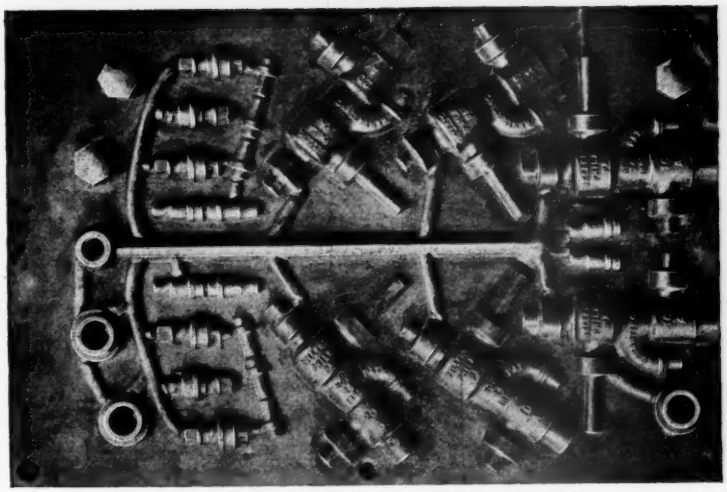


Fig. 4—Card Patterns, Injector Parts.

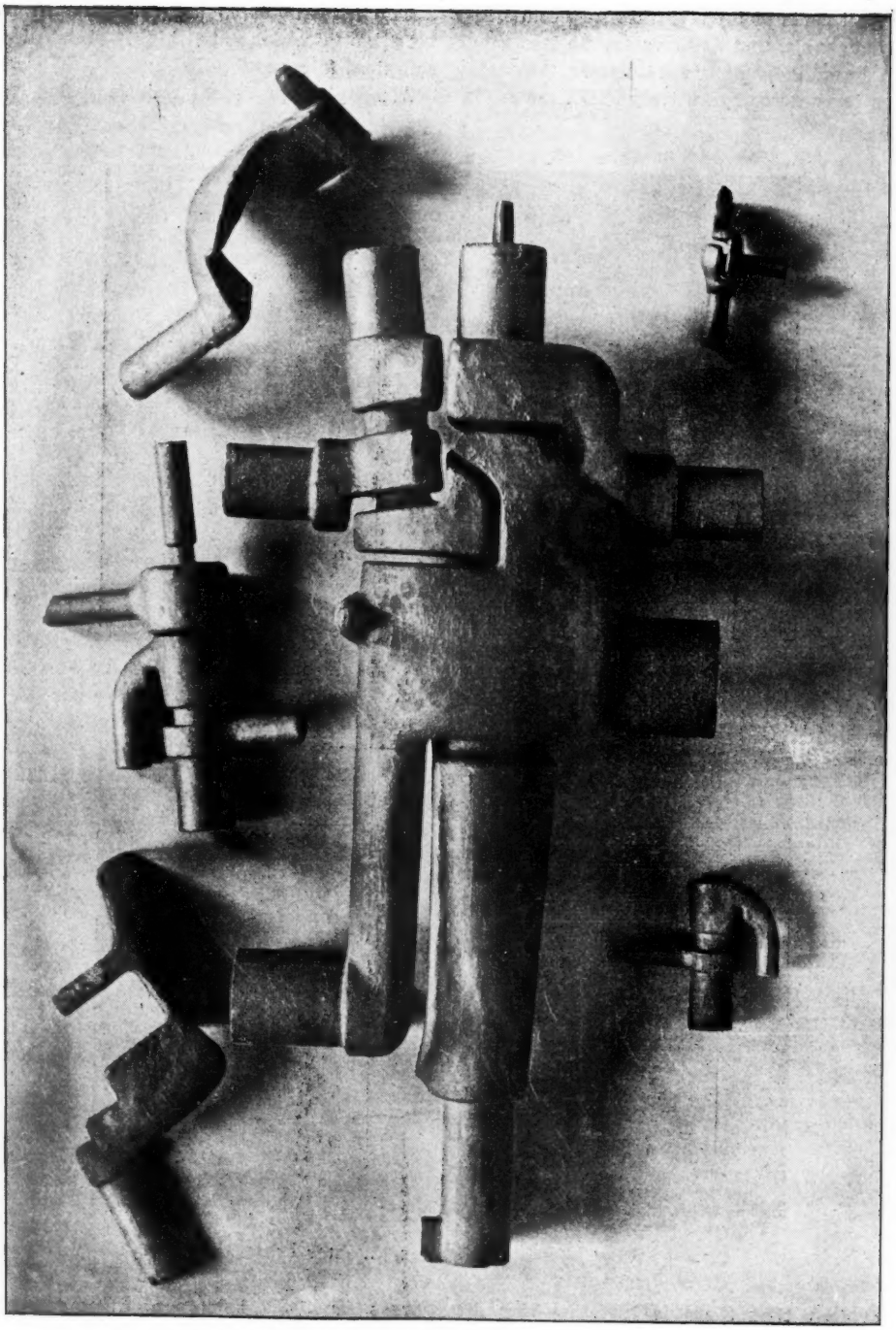


Fig. 5—Injector Cores.

ordinary yellow brass, while much cheaper, is not adapted to this work and it has been proved by many experiments that the most expensive bronze is the most satisfactory, both to the user and the maker of injectors.

The bronze metal was formerly melted in furnaces sunk beneath the floor, capable of holding No. 80 black lead crucibles, but a few years ago a French portable furnace was imported and this has practically superseded the older furnaces, on account of greater rapidity of melting and economy of fuel.

While we have shown that the work done in this foundry is of a delicate and refined character, as compared with ordinary brass founding, there is nothing peculiar in the molding or materials other than we have named, and the secret of success lies in the care bestowed in all the steps of designing and making patterns, cores, etc., and in using only the best bronze.

The castings when removed from the sand are cleaned by the sand blast, using steam pressure to force the sand into all the cavities. In addition to the manufacture of injectors, hydraulic cylinders for various machines are cast, and, although no efforts are made to secure outside work, the government and other customers who have occasionally required special castings made of fine bronze have found it to their advantage to avail themselves of the facilities which are here afforded to obtain guaranteed work.

The Western Foundrymen's Association.

The regular monthly meeting of the Western Foundrymen's Association, was held at the Great Northern Hotel, Chicago, Wednesday evening, December 18. The president, John M. Sweeney, occupied the chair.

On motion the reading of the minutes of the last meeting were dispensed with.

The following applications for membership were presented: Gibson Iron Works, Gibson City, Ill.; Aurora, Ill.; P. H. & F. M. Roots Co., Connersville, Ind.; T. P. Kelly & Co., Chicago; Chicago Pneumatic Tool Co., Chicago. On motion, the applicants were elected to membership.

The headquarters committee reported progress and was given further time.

On motion of Mr. Frake, chairman of the by-laws committee, the association went into committee of the whole to discuss the new by-laws as reported by the committee. Mr. Hanna was called to the chair. On the rising of the committee, the chairman reported the by-laws as amended. They were adopted and the committee discharged. The principal changees are the provision for three classes of members, active, associate and honorary; and for an editing committee to secure papers for the meetings, and to edit all the publications of the association.

On motion of the chairman, Mr. Stantial, the committee on test bars was discharged from further consideration of that question.

The paper of the evening was then read by its author, Mr. P. S. Dingey. It is as follows:

Care of Patterns and Pattern Account.

Every firm, large or small, should have some system for keeping patterns in good order; generally, one, two, three or more men (according to size of works) are delegated for that purpose and held responsible—many firms do this but do not cover ground enough.

By good order generally is meant from the time a pattern is made until it is no longer fit for use. To ensure this there must first of all be a system of making patterns so that they may be recognized by their mark, rather than depend entirely upon a name for reference. Whether it is best to mark with number or letter, or with both number and letter, are points open for discussion, but I have been accustomed to the latter and have found it very convenient for classifying work, the letters being used for that purpose. The marking, of course, is done in the usual way by fastening pattern letters on the patterns and stamping every loose piece and core box belonging to the pattern correspondingly. This is done by every firm making any pretentions to order, but needs to be emphasized because there are so many who do not, and because it is one of the first requisites toward keeping patterns in good order.

In connection with the marking or symbolizing of patterns, a pattern record book must be kept, into which every pattern for each machine is entered, no two being marked alike. The book should be ruled for the purpose and heading printed at the top of each column, indicating its use.

SPECIMEN ENTRY FOR PATTERN RECORD BOOK.

Small Test Cupola.

Shell 27 inches outside diameter.

1	2	3	4	5	6	7
Pattern mark.	Name of part. Cast Iron.	Castings wanted.	Rough lbs. weight.	Finished weight.	Pattern at.	Remarks.
A— 1	Foundation plate	1	....	....	...	...
A— 2	Standards	2	....	....	...	...
A— 3	Caps for plate.....	2	....	....	...	...
A— 4	Upper ring for shell..	1	....	....	...	...
A— 5	Lower ring for shell..	1	....	....	...	...
A— 6	Trunnions	2	....	....	...	...
A— 7	Drop door	1	....	....	...	...
A— 8	Tuyeres	2	....	....	...	...
A— 9	Slag spout	1	....	....	...	...
A—10	Front spout	1	....	....	...	...
A—11	Tipping bar	1	....	....	...	...
A—12	Bracket for support.	1	....	....	...	...
	Etc., etc		....	....	...	...
A—30	Cast steel		....	....	...	...
A—50	Brass		....	....	...	...

SPECIMEN ENTRY FOR PATTERN RECORD BOOK.

Index of firms to whom patterns are sent.

1	Chicago Hardware Mfg. Co...	Chicago,	Iron.
2	Fraser & Chalmers.....	"	"
3	Tarrant & Ramsey Co.....	"	"
4	Whiting Foundry Equip. Co..	"	"
5	R. M. Eddy Foundry Co.....	"	"
6	The Sargent Co.....	"	Steel.
7	Pittsburg Steel Casting Co...	Pittsburg,	"
8	Eureka Cast Steel Co.....	Chester,	"
9	Solid Steel Casting Co.....	Alliance, O.	"
10	Thomas Bros. Mfg. Co.....	Chicago,	Brass.
11	E. Smeeth's Brass Foundry...	"	"
12	J. J. Ryan & Co.....	"	"

A form of entry which I found to work very satisfactorily at the M. C. Bullock Mfg. Co., of this city, some years ago, is shown by the ones prepared. Column No. 3 shows the number of castings required from each pattern to complete one machine. Though the weight columns have nothing to do with the care of patterns, they will be found very useful for reference. In connection with column six an index is prepared, giving the names of firms to whom patterns are sent, each firm being given a separate number. When a pattern is sent out the number corresponding to the firm is placed in the column with lead pencil, and when returned the mark is erased. This is about the most simple method for keeping track of patterns I know of. In addition to putting down the numbers of firms in this column, the date at which the pattern was shipped may also be inserted; this last item has settled and prevented many disputes in my experience.

Much more might be said on this first requirement towards the proper care of patterns, that is the marking—but it is only intended to touch one or two points, enough to invite discussion.

Let the storage be the second consideration, and in considering it I would say first, give the patterns plenty of room, so that they may be seen when wanted, and though the space occupied may be valuable, it will be found to pay in the end. I believe manufacturers grudge space for pattern storage more than for anything else, hence the usual piling up and burying patterns out of sight.

In most places the light is not too good, and should not be obstructed—a liberal space and good light are most essential in keeping patterns in good order, so as to enable them to be found when wanted.

If a letter has been used to designate a certain set of patterns (of an engine for instance), let the shelf on which the patterns are stored be marked with that letter.

Only those in charge should hand patterns out or put them away, adopting some such method as when tools are handed out from tool room, for what is a pattern but a tool. Patterns that are of no use as patterns any longer often occupy valuable space when they might just as well be used to start the cupola.

For the third point, let us suppose a pattern has found its way to the foundry; now it will not get quite so much nursing and must be prepared to receive hard knocks—many patterns expire before their time from injuries received in the foundry, having been sent there without rapping or draw plates in them, and as the molder has to get the patterns out somehow, he is not to blame when the pattern is damaged through lack of proper appliances for drawing it. It is a good thing when draw-plates are put in patterns, to screw them to the bottom, instead of on top of the patterns, thus preventing screws and plates from being pulled out, or when patterns are, to use a shop phrase, "boxed up," to put the plates on the inside while building.

Molders, as a class, have the reputation of being very careless with patterns. The statement, however, needs to be qualified, for I have seen many patterns which should be given no quarter—new patterns, too, finished up fit for a piece of parlor furniture, can see your face in them, but when a molder has rammed one of them up, and pulled it out of the sand, looked at his broken mold, then at the pattern with the sand sticking in

the corners and to the beautiful varnish, he is not likely to feel very kindly toward it and is more likely to abuse that pattern than take care of it. I would not abuse it a bit.

Again there are other patterns which are made to mold and will hold together with ordinary usage for a long time; this kind should be always taken care of by all, but they are not. Take, for instance, what may be considered a trifling illustration—one molder, immmediately after drawing a pattern, will take out the draw spike, wipe off the water from the top, and after brushing it, will lay it aside in some place where it will be free from kicks and other floating dangers in a foundry. Another molder draws his pattern, throws it aside, in the gangway, on the sand heap, anywhere, and will leave it soaking in the water he has drenched it with, and turning to patch up his badly rammed mold, calls the pattern all kinds of fancy names—such is the difference in molders as to their care of patterns.

When there is an order for a large number of castings from a wood pattern it is well to send it to the pattern shop occasionally to be overhauled and varnished; foremen should watch this and not allow the molder to make "just a few more."

Among the so-called small evils which shorten the usefulness of a pattern are carelessly pushing the vent wire into the cope side, thereby making countless small holes and splitting off edges—paring dowel pins with a jack knife—leaving the pattern in the sand over night—allowing any kind of a helper to handle it, when it should only be done by men accustomed to patterns.

When an order is filled, notice should be sent to the man in charge of the patterns, at the same time it is sent to the office, so that he may have the pattern with all its parts and core boxes gathered up and removed from the foundry as soon as possible, for the ordinary foundry is not a good place to store patterns. It not only pays to have men whose business it is to watch and attend to the patterns, but it also saves much annoyance and worry. The taking care of patterns is a subject that may be profitably discussed without much fear of exhausting it, and considering the close relation of patterns to the foundry, the making of them might also be discussed in these meetings without being out of order, in fact it would suggest many points in molding that perhaps would not otherwise occur to us.

How patterns shall be shown as an asset, is the subject I scarcely dare touch because of its complications—the subject needs to be carefully considered, as the cost of a pattern may not represent its value; in fact, as already stated, a great many patterns are only so much kindling wood, but firms do not like to destroy them, s the week after something may come in for which the pattern may be needed. At the same time its value as an asset may be very small. Contracts for machinery for which an estimate has been given usually include the cost of pattern work; in such case, therefore, we may say the patterns are paid for. The question occurs, ought such patterns be reckoned as an asset? Standard patterns in a line of business might be estimated at actual cost, minus a certain percentage for depreciation; other patterns, that may or may not be wanted, should be estimated at a lower figure. Experimental work should not enter into the estimate of the value of a pattern, nor should repairs. Supposing a firm built locomotives, it would be quite proper to figure the locomotive patterns at say 75 per cent of cost—while patterns say of a pump might be considered quite high at 25 per cent; if the firm built pumps and only occasionally a locomotive, I would reverse the above.

It is important that the value of patterns be correctly estimated, so that the insurance should not be heavy, for to be heavily insured in the patterns is very unprofitable, unless a fire be looked forward to as a good thing.

Mr. Pettigrew: Mr. Dingey says that patterns should be removed from the sand every night. What are you going to do if you have a large pattern that will take a week to mold?

Mr. Dingey: I meant those patterns that are damaged by leaving in the sand over night. Of course, if a man is molding in loam or very large dry sand, and is using a pattern for that one purpose, it is hardly possible to get it out of the sand.

Mr. Pettigrew: There is one thing I have noticed about patterns lately, and that is that since some of this patent glue has been used on them, it is a hard job to keep them

together any length of time, especially when they are subject to heat and cold and dampness, so that it would affect them; they fall to pieces. I think that one good thing that could be done about patterns is to use a sort of glue that would hold together under any conditions.

Mr. Sorge: I think there are a number of things suggested in the paper that are worthy of papers in themselves. But passing over the whole of this matter of the old patterns while they are in the foundry and while they are in the store-room, the last two paragraphs of the paper refer to estimating upon the patterns as an asset of a plant. It is a subject which, as the writer states very correctly, is very important, and is a difficult one. I notice that he says that it is important that the value of patterns be correctly estimated. Who is going to do the estimating? Whose word is going to be good for it that the estimate is really a true one and represents true values? Now, it appears to me there is only one value, one true value to anything, and that is its earning capacity. The earning capacity of a piece of machinery, of a pattern, or of any other article is certainly the thing that determines its value. And I believe that is the only basis on which you will ever get a true valuation of patterns, for the use of the insurance as well as for the use of your inventory. The thing can be arrived at. It is somewhat of a process to get at it, but you can arrive at it by the value of the product produced by these patterns in a given time, in other words, by the profit obtained from the castings, due to the superiority or inferiority of the patterns supplied. It is rather a long question, I think, that you have got in here. I have given the matter a good deal of thought, and hope some day to come out with it. Don't know when it will be; in the dim distance, I suppose. I don't believe, after the thing is studied out, that any estimate placed on a pattern by any individual is one that will be accepted as true and correct by all the others. But I believe that the moment you make the earning capacity, the net earning capacity, understand, the basis of your valuation of your patterns, that moment there can be no cavil with that valuation.

Mr. McArthur: I would like to ask Mr. Sorge a question. For example, if a man has a set of engine patterns, and, we will say, he makes $100,000 worth of engines from those patterns in a year, at a profit of, say, $20,000, what would you count the value of those patterns in that case?

Mr. Sorge: Well, that is rather a difficult problem to answer. It is not impossible of solution. I would like to show it to you solved. I think I solved it in a way that there will not be much cavil about. I base it upon this: A casting has a certain value, market value; it has a certain cost. The difference between the two is the profit on that casting. In the cost I expect to include all labor, material and expense; and in expense I expect to include what might be called the probable insuring value of the good will of the business. That is, there is a certain percentage that the good will of the business depreciates unless constant effort is used to keep the business at its highest state of efficiency, and for that depreciation a certain valuation wants to be put into the expense account; that is, you want to keep a sinking fund so that if the effort, the high grade effort which you perhaps have in your business is not always available, then within a given time to be determined by statistics, your business shall have returned to you its full good will valuation by the time it becomes valueless. That should go into your expense account and should be taken from the profit. You obtain thereby the absolute net profit. I hold that the pattern shop is entitled to a share in that profit as well as the foundry, just as well as later on when that machine is finished and you have the total net profit after going through the machine shop, the machine shop and the foundry are entitled each to a share in that profit. So, also, the pattern shop is entitled, because a portion of the effort to produce this machine was made in the pattern shop. The relative amount of the profits assignable to the two departments, foundry and pattern shop, I think, will be fairly in proportion to the amount of labor expended in each, assuming that both are at an equal point of efficiency. Now, then, the moment you obtain that, that moment you ascertain the fair net profit assignable to the pattern shop. Then capitalizing that fair net profit at the ordinary rate of interest, you obtain a valuation for the pattern, which is one that cannot be questioned by your insurance men

or anybody else, because that is what those patterns will earn for you in net money.

Mr. Hanna: I want to take issue with Mr. Sorge on the valuation of a pattern. It seems to me that the value of any commercial article is simply what it can be reproduced for, regardless of what it will earn. I think a pattern would be no exception, and when it comes to figuring the earning capacity of the pattern as part of its value, I am afraid the insurance people would make trouble with us. Of course, there are some things, probably a Chicago street railroad franchise, that would be valued otherwise than at the amount for which they could be reproduced. I don't know about that, either. But it seems to me that is the proper way of putting a value on anything, any tool, any article of commerce, at what it can be purchased for in the open market, what it can be built for, labor and material and incidental expenses included. When it comes to putting a valuation on patterns it would seem to me that the actual first cost account is the thing to be taken into consideration, with an estimate of the probable life of this pattern. Knowing how many castings had been made from this pattern, then you must estimate how many more may be made until the pattern is useless and has to be reproduced, that is my idea:

The Chair: I want to ask, if in case of a pattern that has been charged in the cost of the output, and thereby paid for, would you give a value to the pattern as an asset?

Mr. Hanna: If it is a pattern of a standard article of manufacture, something that will be used every day, I most certainly should give it a value. If it is made for a machine that is to be built but once and was paid for at that time, it is kindling wood.

The Chair: Suppose a new part were ordered for a machine; make the pattern over again?

Mr. Hanna: Yes.

The Chair: I fail to appreciate how the value of a pattern can be more than it will cost to reproduce it, as Mr. Hanna has put it. I think the insurance company, in place of paying the valuation on the earning power of the pattern, would simply say, we will replace the pattern—which they would have a right to do, generally—if they could. Some years ago I was called in to give expert testimony on the value of patterns, before an assessor. The county assessor had assessed a lot of stove patterns at a very high valuation because he had understood that the owners of the stove foundry had pat a very high valuation on their patterns, on that form of stove. The lawyers finally got mixed up in the case, and they had a lot of testimony. The question was asked me at that time, what was the value of those patterns. I asked what kind of a value. The lawyer said he could only ask that question, what was the value. I said I could see two values, one an insurable value, what it would cost to replace the patterns, they being in active use, and the other the amount for which they would sell if they were put up at forced sale. In that case it was finally concluded, and perhaps without any evidence strictly to the point, that the value which should be taxable, was the value they would sell for on the market if put up and sold, although they were worth perhaps considerably more to the firm using them, as a tool—as Mr. Dingey's paper classifies patterns—to carry on their business. This paper, as Mr. Sorge has said, is readily divided into several different heads. I take it that a system for the care of patterns is a good system if carried out. And it is generally true that the man who can't make his own system can't carry out any system. But the question in the latter part of the paper, of the valuation which should be put on patterns, and how they should be placed, particularly in variable work, is one that I think we could have a great deal of very intelligent discussion on, and find out something that perhaps we don't know now.

Mr. Sorge: In talking about valuation of patterns for insurance value, you want to take into consideration the fact which you brought up, and that is, the value of the patterns depends upon its use.

The Chair: Excuse me, don't you mean that its earning power depends on its use? How can the value be more than it costs to reproduce it?

Mr. Sorge: I don't say that it is; it don't figure out so, either. A statement has been made, and the inference has been made by the president and Mr. Hanna that according to this method of figuring the value of the pattern would figure more than the cost to replace them. When this is figured out, and I have taken occasion to do it in one or two

cases, the value comes considerably below the actual cost price. And I do not think that you can put upon patterns the value which is the cost of replacing them. To start with, usually you have considerable wear out of a pattern. As Mr. Hanna correctly states, in that case he has to take in the element of time which that pattern will last, or in other words, the amount of work which the pattern will do, or its earning capacity. Whether you put it in the shape of the time it will last, or whether in the shape of the amount of dollars which it will earn, the two will work together. On the other hand, you have usually in your pattern loft, from one-half to nine-tenths of the patterns that are dead lumber, during five years out of six, or I might say 364 days out of 365, while on the 365th day some set of patterns becomes immensely valuable. It becomes worth as much as it cost to reproduce it. I do not think that the question of whether a pattern has been charged in the cost of a job or not comes in at all in the valuation. It doesn't make any difference to the insurance company or anybody else whether I have received one dollar or ten thousand for it, but I have got the thing in my hand and I want to use it, that is the thing; and it has a certain value to me, or a certain value to others. Is there a recognizable value that can be fixed upon so as to satisfy all parties, and it is possible for anybody to give any other basis to go upon than the earning capacity? Anything else, any other estimate that you may make, depends upon the individual, and the estimate will vary with the individual, and no two estimates will be alike. Isn't it well that we should come to some basis, to a logical deduction, a valuation from some certain premise?

Mr. Dingey: With regard to the earning capacity that should be be put on a pattern, I don't see how it can be estimated in that way, because, as the president has just remarked, a pattern may or may not be used again. How can you get at the earning capacity of that pattern? You don't know how it will be used, don't know whether it will be used again, and I don't see how you can put a valuation on the earning capacity.

Mr. Sorge: I would like to defend myself against the statement of its being an estimated earning capacity; it is actual earning capacity, determined from the actual costs and actual earnings from the castings produced by it, not an estimated earning capacity.

Mr. Hanna: How are you going to tell what the pattern is going to earn, if you have no chance to use the pattern?

Mr. Sorge: By taking a long average of a year or two for what work has been done with those patterns; that is the basis I would go on. Take one or two years of work actually accomplished by the patterns in your place; assume that to be a fair basis of what you are going to do.

Mr. Hanna: About when, then, would the pattern be ripe and ready to throw away? If we used it once, the first time, how long would we hold it?

Mr. Sorge: That depends on your judgment; if you are never going to use it again, throw it away.

Mr. Hanna: The element of judgment comes in then.

Mr. Sorge: The second year, for instance, would show that certain patterns were not being used at all. And your judgment would indicate whether they should be destroyed.

Mr. Hanna: It seems to me that a pattern has value as put upon it by the firm, from the record kept, as long as it is not obsolete; when it is obsolete then it is fit for kindling wood, but it still has a value to the foundryman, whether it is this year or ten years from now. If he has manufactured but one machine he is very loth to destroy that pattern that is fairly well made, because he surely will use it some time, if he saves it, and that machine is in existence. Therefore, these patterns always have a value. So a man, in knowing his business, governs himself according to his inventory of patterns and the valuation he puts on them, and I don't think the earning capacity of the pattern should be taken into consideration.

The Chair: The Chair has appointed, under the new by-laws, as editing committee, Mr. A. Sorge, Jr., Mr. Wm. Ferguson and Mr. J. K. McKenzie. Before the next regular meeting, the joys and sorrows of Christmas and New Year's will have gone by, and I trust and hope that we will have a full attendance hereafter, more, if possible, than this evening—I mean as to numbers—and that each individual who attends these meetings will endeavor to enlarge the discussion. I feel sometimes that I insist, perhaps, a little too much on this, but I feel that is the

way to make the association grow. We don't want anything stilted at these meetings, we want to come here and talk to each other informally, and just try and infuse a little of that feeling into ourselves, and take advantage of it. The finances of the association are in much better shape than they have been heretofore. The secretary advocated that a little of the association's money had better be spent this evening in the way of refreshments at the other end of the room.

The meeting then adjourned. After adjournment, a lunch was served, and the members remained for some time in friendly discussion.

Ferro-Sodium for Iron Foundries.

W. E. Wilkes, of Pittsburg, some time since addressed a communication to the Western Foundrymen's Association on the subject of Ferro-Sodium, and also published some items in the Machinery Molders' Journal, of which he is editor, on the same subject.

As little or no information seemed to be forthcoming concerning it, the following from the pen of Mr. Walter J. May, of London, England, will be of especial interest:

Ferro-sodium is a new invention, and has only been placed on the British market quite recently, where it has a large and increasing sale, firms of high repute taking it in lots of several tons at a time, so that it is a proved success so far as the British foundry trade is concerned, and probably will be the same in the United States.

Ferro-sodium is a compound of iron and sodium chemically and mechanically combined, and is used for the fluxing and purification of cast iron and steel. Sodium is undoubtedly one of the best purifying agents for iron, although in a pure state it is too dangerous when applied to molten metal, but when prepared in the form of ferro-sodium all danger is removed, while the effect produced is excellent in all ways. Sodium removes sulphur, phosphorus, and other objectionable elements from molten iron for the simple reason that it has a greater affinity for these than for iron, the result being that the chemical reaction increases the fluidity of the metal, and at the same time brings all the impurities to the surface, giving a perfectly clean pot of metal to the molder, and preventing the formation of wasters from faults in the metal. In fact, its use enables a large proportion of scrap iron to be used in producing engineer's castings, which will plane or turn up without speck or flaw.

Ferro-sodium is not an expensive flux, as the price f. o. r. or f. o. b. London for Nos. 1 and 2, is 9-6d per cwt., and for No. 3 15-6d per cwt., with a substantial discount for bulk. It is necessary to give the London prices that some comparison might be made, but it may be taken that the net prices in the United States would be very nearly the same, as with anything like a demand, works would be established for its manufacture in some central district.

In use ferro-sodium can be applied either in the ladle, crucible, or cupola; in the first, being placed in the bottom and the metal tapped on it; in the second, being pushed into the molten metal with a rod just before pouring, while in the cupola it would be charged with the metal. Approximately one pound of ferro-sodium to the cwt. of metal should be used when ladle or crucible work is done, but with cupola work, the amount charged should be about half as much again, the blast carrying part of the sodium off. Roundly, this proportion is one per cent. for crucible or ladle practice, and 1½ per cent. for cupola practice, and in practice I find this ample unless the iron be very dirty or impure, when, naturally, a somewhat larger proportion will be needed. Taken altogether, the cost of ferro-sodium per ton of castings is not large, and as its use prevents wasters, the cost is more than recouped, as for most ordinary castings, a very large amount of common scrap metal can be used.

The action of ferro-sodium is to remove all impurities from the metal, to render it very fluid, and to make the castings run free from blow holes, or other imperfections, and the reesult of its use is that the finest engine or electrical castings are produced, and this without wasters, there being no element of doubt as to what the castings will be if the molding is done with ordinary care. ferro-sodium does not, however, cure or prevent errors in molding, and anything which did this would at once do away with the necessity of employing experienced workmen.

Taken altogether, ferro-sodium is one of

the handiest fluxes one can have in the foundry, as it is cheap, ensures perfect castings, and does not injuriously effect the metal. In fact, tests which have been made tend to show that iron fluxed with ferro-sodium is improved in strength, but assuming that these tests were dependent on the iron used—of which there is no evidence—it is scarcely likely that firms who turn out work for the British Government, and for large firms of engine builders of the highest repute, would use anything which would in any way deteriorate the quality of the metal.

I may add that the Ferro-Sodium Co., Ltd., of 39 Victoria St., Westminster, London, will forward a 14-pound free sample f. o. b. London to anyone desirous of trying this new flux, and this will afford an opportunity to anyone wishing to test its efficiency with American irons.

Division of Labor in Foundries.

A. SORGE, JR.

It has frequently been remarked, and with much justice, that the foundry has not kept pace with other branches of industry in applying the most advanced methods of manufacture. Although some special tools are being used, and some foundries have adopted a more or less perfectly developed scientific method, still the great majority are largely following the old way of cutting and trying.

It is a well known principle of modern manufacturing that the specialist in any one manipulation is the most economical man to employ to do this particular work. In the machine shop nowadays we seldom find the old-time general machinist, but in his place are the lathe hand, the planer hand, the fitter, etc. Similarly we find in the boiler shop the riveter, the layer-out, the puncher, etc. In woodworking, shoemaking and all other industrial pursuits we find that each man has some special step in the process of manufacture at which he has become expert. The result has been, in these lines, that work is not only done much more cheaply, but also with more exactness. A man repeating the same operation continually, all day and every day in the year, learns to do this with an accuracy and quickness that the general workman in that branch can not approach. Furthermore he concentrates his thoughts and efforts upon finding methods by which the laboriousness of his work may be reduced, and he frequently succeeds in this. His experience in the single direction in which he works becomes very minute as to methods and materials, and he often assists in introducing considerable economies. These results are being and have been produced in most of the industrial pursuits.

But the foundry has lagged behind. Here we still find the craftsman who mixes and tempers his sand, rams up his mold, makes his own gaggers, mixes his wash, etc., pours his molds and shakes out his castings. Not in all foundries do the molders do all these things and many more, but in by far the greater number. In some a partial division of labor has been made with results that tend to show decidedly the advantages to be gained by doing this systematically. There can be no question that the molder's acquired skill can be most profitably employed, both for himself and his employer, in molding, while others supply him with the needed materials ready prepared, and still others, who have been specially trained for this, pour the molten metal into the completed mold. The sand should be cut up, mixed and tempered by men who make this a specialty. The molder may direct them as to what he wants, but they should do the work for him. Others should make the needed gaggers and see to it that the molders are supplied with them. Similarly the wash should be mixed by someone specially detailed for that purpose. In fact the various steps in the process of making castings should be given to various men to perform, and in as minute detail as possible. The size of the plant and the kind of product will determine the extent to which this detailing can be carried profitably. In small foundries it may be necessary to have one man attend to several details, but in all cases should the mechanic or molder be left free to expend his time and efforts in molding only. If this is once carried out, then the further division of the remaining labor will soon follow, and we will enter into a period of advancement in foundry work which will soon bring us abreast of those trades which have outstripped us so far during the last quarter century.

A Serviceable Flask Pin.

Mr. H. J. Graf is one of the best known foundry managers in the west, having made for himself in many ways a splendid reputation while in charge of the works of the Tod Pulley & Shafting Co. at East St. Louis, Ill. While there he, among other things, devised a number of convenient foundry appliances that were of great value in handling the work in their shop.

Among these was a flask pin possessing so many advantages that he has been persuaded to place it upon the market, and those who have used it seem to agree in giving it their unqualified endorsement.

Our illustrations give a good view of it as detached in several parts and as applied to a flask.

Nos. 1 and 2 give a longitudinal mid section taken through the parts of the flask to the cope and drag.

Fig. 2 is a perspective view of a detachable ear which is secured to cope, while Fig. 3 is a detail perspective view of detachable ear as secured to drag. Fig. 4 gives a view of the detachable pin which is normally mounted on the ear, Fig. 3. Fig. 5 shows double detachable ear intended to take the place of Fig. 2 whenever deep lifts are to be made, thus doing away with the slides so often fastened to sides of flask and which seldom serve their purpose as intended, owing to the

FIG -1-

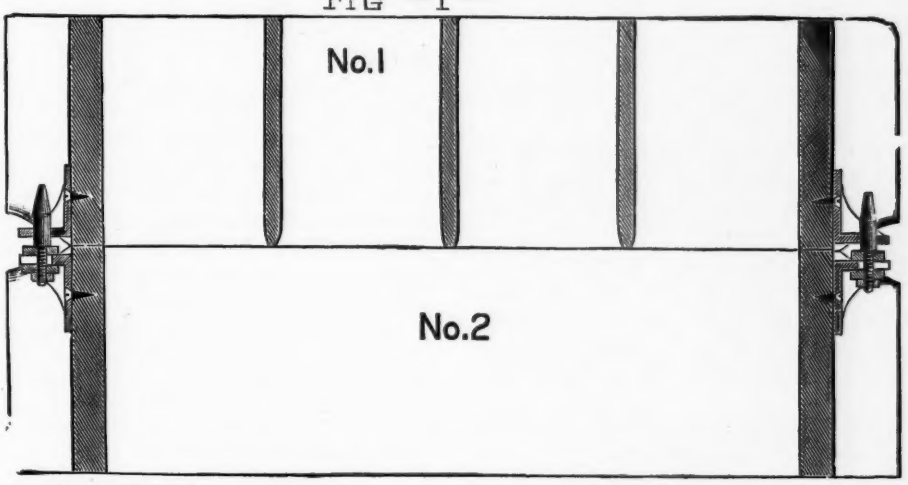


FIG-2-

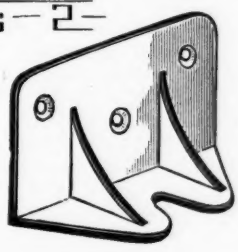


FIG-3

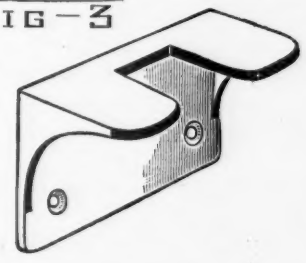


FIG-4-

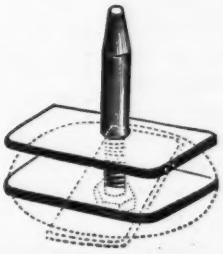


FIG-5-

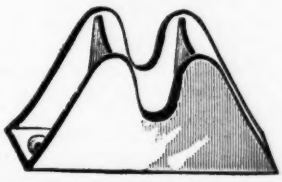
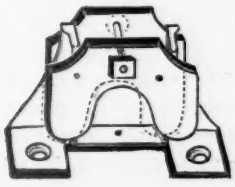


FIG-6-



reasons so familiar to every foundryman.

Fig. 6 is a bracket provided with detachable plates which are secured to a match follow board. It contains a rectangular depression placed central with Fig. 4, so that after cope is lifted off the board is rapped and the adjustable plates are placed against Fig. 4, which will then act as a guide to enable the board to be drawn perfectly straight, giving perfect lift.

As the rectangular depression in Fig. 3 is much larger than the pin, Fig. 4, the latter can readily be moved and adjusted to fit brackets, Figs. 2 or 5 on cope.

It is claimed for this device, among other things, that it will prevent shifting and in many cases save castings. It will enable the molder to obtain good lifts, thereby saving time mending molds. It will save expense of replacing and repairing so often necessary after shaking out, because the pins, Fig. 4, can be quickly removed after cope is placed upon drag and clamped.

It will to a certain extent enable flasks to be made interchangeable and again it will permit of copes being shifted to suit the bars, because when the latter are cut out the pattern does not always come in right place.

It will save ends of flasks from becoming broken (as in case of old style pin and plates) when shaking out, also expense of putting on wooden slides for flasks having straight lifts.

The designer claims that the very small extra cost will be repaid many times over in a short time by any one using them, and from what THE FOUNDRY has seen of them in operation we believe that for convenience and merit they are all that is claimed for them. For further information address H. J. Graf, 3559 Caroline street, St. Louis, Mo.

Fire destroyed the office of the Whiting Foundry Equipment Co.'s works at Harvey (near Chicago) on the evening of January 6th. The drawings and records were saved and new office quarters convenient to the works were at once engaged. The fire communicated to the erecting shop, damaging a portion of roof; but the machine, cupola, blacksmith shops, foundry building and power house were not harmed. Work will continue as usual. The space formerly occupied as an office will be added to the machine and erecting shops, to increase the capacity of these already crowded departments, and a new and separate office building will be erected at once.

The company announce that they will be able to handle all business as usual without delay or interruption.

Obituary.

Mr. George C. Jennings, of the firm of Johnson & Jennings, foundrymen in Cleveland, died at his home there recently.

Nicholas A. Didier, secretary and treasurer of the Crescent Foundry and Construction Company, Limited, Allegheny, Pa., died at his residence in that city last week of typhoid fever. Mr. Didier was born in France, and located in Pittsburgh about fifteen years ago.

J. S. White died at his residence in Pawtucket, R. I., suddenly, recently, in the 78th year of his age. He had been ill and confined to his house for more than a year. Heart failure was the cause of death. He was born in Norton, Mass. At the age of 23 years he went to Pawtucket, and went to work in the foundry of his father, Zebulon White, one of the pioneers of the foundry business in Rhode Island. At the death of his father in 1859 he and his brother took the business and continued it until 1880, when the deceased purchased his brother's interest and has since conducted the business.

At Milwaukee, Wis., on the 10th inst., John A. Dutcher, president of the J. A. & P. E. Dutcher Company, died suddenly. John Ashley Dutcher was a native of Connecticut, born at Salisbury, Litchfield county, November 1, 1829. His ancestors were among the early colonists of New York. He went to Milwaukee when 20 years of age and found employment as clerk in a grocery store, and later became a partner, the firm name being P. W. Badgley & Co., afterward Dutcher & Sexton and then Dutcher, Ball & Goodrich. Later Mr. Dutcher became interested in the manufacture of stoves under the firm name of Dutcher, Vose & Adams, and was at the same time interested in the tea firm of Dutcher, Collins & Smith. Later the stove firm were dissolved and the manufacture of mitis steel castings was begun by Mr. Dutcher and his son under the name of J. A. & P. E. Dutcher Company, of whom he was president at the time of his death. Mr. Dutcher was one of the first presidents of the Milwaukee Merchants' Association.

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

THE FOUNDRY

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JOHN A. PENTON,

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THE FOUNDRY is issued promptly on the 20th. of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

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Trade Outlook.

The foundry trade the country over is in a very normal condition, neither very bad or very good. It has been better and worse, and seems to be, if anything, a little more settled and better than in the closing days of 1895. A great many new contracts have been entered into for castings by railroads and other concerns who are accustomed to cover their wants for the year at this time, while manufacturing concerns, especially those in staple lines or where the product is marketed after it is manufactured, are giving witness to their faith in the future by running full-handed as a general thing.

This refers principally, of course, to stove and agricultural shops, although builders of stationary engines, machine and wood-working tools and modern manufacturing machinery generally are not as nervous as to the future as they have been.

Malleable iron foundries are likewise busy and in several parts of the country we hear of enlargements and new plants going into existence. Pig iron, the foundryman's greatest staple, has, during the past month, gradually sagged in price until it is almost as cheap, relatively speaking, as it was a year ago. That is to say, that its increased cost at present is almost entirely owing to increase in cost of ore, coke, fuel and railroad rates.

While it may be better for some lines of business that pig iron should command a good price, it is very questionable whether it is not better in the long run to have it at as low a figure as possible consistent with a living profit, better in fact for the furnaces themselves.

Pipe foundries are busy and the car shops are reporting an increased number of contracts. Altogether, the situation on the whole is fairly good and while it will probably improve some as the season advances there is really no great cause for concern.

The Scrap Heap.

They are at it again. The daily papers have commenced to discuss in every issue this presidential election business and are printing interviews, reports and rumors double-leaded and under "scare" headings.

We believe we would all be amazed if any accurate data could be furnished of the amount of this stuff appearing every twenty-four hours and if we could form any estimate of its unsettling nature on the commercial world we might feel less kindly than we do towards our favorite paper.

* * *

Then again we have this treasury-reserve-bond-gold-greenback nuisance that seems to be with us continuously. One set of politicians are sure the future safety of this country depends upon keeping things as they are, and a half a dozen others are equally as certain that salvation lies in adopting their own pet theories, and so it goes. If our prosperity should depend upon the united action of our national legislators it might be an anxious time for Americans.

* * *

As the matter stands, however, our resources are such and the volume of business so great that it actually seems as if the country was running itself independently of those who imagine that they are directing its course.

* * *

We notice that the Philadelphia Foundrymen's Association are taking up in good earnest the question of forming a National Defense Association that will insure its members against the serious evils arising from strikes and labor disturbances.

* * *

The very fact that such a move is contemplated shows that foundrymen are beginning to look at matters as they really are, and if, as pointed out in these columns two months ago, such a policy is determined upon and a joint committee consisting of officers of the union and representatives of the asociation appointed, the foundrymen of the country will be setting other industries a noble and patriotic example.

* * *

Such a move would doubtless meet with the hearty co-operation of the union and its officers and if it did not neither it or they are deserving of any of that sympathy sometimes extended them.

* * *

But the abolishing of labor disturbances would not be all.

Might not this move be the indirect means of establishing closer relations between employer and employe on other lines and do much substantial good in other ways? The solving of the apprenticeship problem is one of these, and with its settlement might we not expect a superior grade of workmen in our foundries? Men who were superior to the rank and file as we find it to-day, not only mechanically but intellectually and morally as well.

* * *

The Western Foundrymen's Association is likewise turning its sails to the breeze and inaugurating some radical changes in its constitution that will help it materially.

They have established three classes of membership, active, asociate and honorary. The first to consist of those only who are actively engaged in the foundry business, the second to contain those who are interested in its prosperity, such as newspaper men, foundry supply men, etc.; the third, those whose achievements or position in the foundry world is such as to entitle them to its privileges.

* * *

Then they have an editing committee and this is a feature deserving of especial commendation. This committee will carefully inspect all papers on mechanical subjects before they are submitted to the association and all reports of proceedings will be edited before publication. This will prevent the association from receiving anything that might be considered inappropriate owing to any reason and will likewise prevent the publication of unrevised matter and render impossible the errors so frequent when that policy is not pursued.

A Graphic Description.

We have often wondered why such terms as "Wild West," "Breezy West," "Windy West," etc., originated and were kept in circulation, but the following extracts from a long article in the Kansas City, Mo., Star of December 8th, explains the whole thing:

The largest foundry west of the Mississippi is in Kansas City and there is only one larger in Chicago and none larger in St. Louis. It is the plant of the Armourdale Foundry Company * * * * * * * * *

Kansas City is the second railroad center of the United States, being only one system and one line behind Chicago. ,* * * * It furnished all the columns, sills, etc., for the New York Life building in this city, something like 300 or 400 tons. It has just finished 110 tons of floor plates for the Missouri Gas Company and made 120 tons for the old gas company. Some of the columns cast in the foundry weigh six tons. It has done two-thirds of the architectural iron work in the city. * * * * * * * *

An interesting part of the work is the casting of smoke-stacks, which one of its customers uses on its engines. Smoke-stacks are usually made of rolled iron riveted. A great item in the building of railroads is the washers for bridge bolts. They are cast in cards of thirty. Wooden patterns are made of thirty washers on a card. These are molded and cast by the thousand every day and are, together with other cast washers, a large item of expense to the roads. In the foundry 100 men are kept busy every day molding and casting railroad supplies. Brake shoes are used by the roads at the rate of thousands of pounds a month, and one set of men is working at them constantly. One man can turn out 2,500 pounds of brake shoes a day. A brake shoe weighs thirty pounds. Draw bars are being constantly broken in switching cars and being pulled out and snapped off. There is a regular demand for them on all roads. They are cast in one piece with cores. They weigh 160 pounds, and one man can turn out 3,000 pounds of them a day. * * * * * * *

The foundry room of the Armourdale Company is immense. In it cranes travel back and forth with the heavy, sand-plugged molds of huge iron columns. Men all about are making molds in the sandy floor. Large castings are made in the floor, small ones in boxes or cores. * * * * * * * * *

The cupola is a large cylinder of brick and iron, built in the side wall. It has a melting capacity of twenty-five tons. When molds are ready and a casting is to be made, the furnace is started and pig iron and selected scraps are thrown into the cupola to its capacity. It will melt ten tons an hour. After the metal has become fluid the gate is tapped. In front of the gate is a run to a suspended ladle. The gate is plugged with fire clay. When the plug is taken out the iron, at a white heat, flows into the ladle, and when full the gate is closed. A crane, carrying another ladle, swings over and the molten metal turned from one ladle into the other. The crane then swings to where the large molds are sunk in the floor and they are filled. Small molds are filled from small ladles, borne between two men.

The Armourdale foundry melts in its cupola and casts into useful objects the enormous amount of ten million tons of pig and selected scrap iron every year. It has an output of cast iron greater than any two foundries in Kansas City.

There can be no doubt as to the enterprising character of the management of the well-known Armourdale Foundry Co., and THE FOUNDRY hastens to extend its congratulations to the city and the concern alike.

Foundries that melt ten million tons of pig iron annually are rather uncommon in this country where the entire production is but a little over 9,000,000 tons annually.

I should be very sorry indeed to be without it.

T. CLARKSON,
Foreman Pickering Governor Works,
Portland, Conn.

Krank's Korner.

New Year's promises are the order of the day. We don't want to discourage anybody from promising to do better. We believe the plans laid down by many a young man to make his life worth living and the promises attending these are all very fine, if they were only carried out.

* * *

Any time is a good time to reform. Some do better of their own accord, while others give no signs of improvement till they are compelled by sheer force to drop bad habits.

* * *

We wish later on to suggest a new form of these good-for-one-week promises. Please examine this before purchasing elsewhere. A few years ago we were sponging our living from an uncle on the shores of the Atlantic. This uncle was supposed to be worth a few

dollars, and a certain share of these should upon the occasion of his demise roll towards the writer. About the only thing we did for our board, lodging and an occasional suit of clothes was to lay awake nights and pray for him to hurry up and shuffle of his mortal coil. We prayed hard, but something was wrong with the way we got it off, for instead of gradually disappearing, this uncle of ours actually grew fat on these same prayers.

* * *

We were asked several times in a polite way to do something that would help sustain our appetite, but work had as bad a taste to us as cod liver oil, and we declined with thanks. We tried to draw a salary without paying for it, but found that this can only be accomplished by a railroad director or a clairvoyant. We did not have money enough to fill the former position, neither did we have confidence enough to tell a lie and stick to it for the latter.

* * *

We finally got too heavy a burden for our uncle to carry and he paid the freight on us to the far, far west. We landed in Chicago like a good many others, expecting to have things our own way. The first thing we knew we were living on the sweet memories of the home we had left, and this kind of food is not very nutritious. We hated work but there was no choice. It was root or die, and we rooted, because we contained too much poetic ballast to sink in the Chicago River.

* * *

We rooted into a foundry where the molders used to carry a rapping bar with them to the office when they settled up with the company for a month's services. This was done as a gentle hint to the proprietors not to make the imaginary discount too unnaturally large, and still there are people who insist that there is nothing humorous about the foundry business.

* * *

But this is getting too much of a family affair and we beg the readers' pardon for the transgression. We had to say something to get this thing started and have taken this way to avoid injured feelings.

A boy that naturally takes to work is about as much of a novelty as a policeman dying of consumption. Getting down to work is a good deal like taking a cold bath. You go at it slowly and a disagreeable sensation takes a hold of you. Jump right into it and you say how nice. Sometimes you are pushed into the water against your will and the same way with work? After you are into it once it is not half so bad as it looked.

* * *

We lately fell over a young man standing on a corner smoking a cigarette while he was closing first one eye and then another in an effort to see if his nose was getting red. We begged pardon for the collision and were rewarded by a tale of how a young man can't get a show. We believe he told the truth when he said that he couldn't get a show, but we differ as to who are to blame for it.

* * *

This young man did have a job in a tobacco factory, but the wages were too low. Then he entered a woodworking establishment and the sawdust annoyed him. His last venture in the struggle for bread was to tackle a foundry, but, he wound up by saying a fellow might as well be in the infernal regions, for no one brought up by respectable parents would make himself an outcast of society by covering himself with foundry dirt.

* * *

Most young men prefer something that is easy to take, like Ayer's pills. A job with hard work attached to it is about as common as soup in a cheap restaurant. What stands between most people and prosperity is work, and how often don't we see them trying to get over this by stepping on their uncles and aunts. We believe these are a poor kind of stilts to get along on. A young man must work before he becomes a good mechanic. We have seen some jump up pretty high through the influence of wealthy relatives, and when these started off for the promised land the young, or rather old man, by this time, had to come down and go to digging sewers, because he had not obtained an insight into the fundamental principles underlying his position.

* * *

Some people may hold good positions and be nothing but low-grade figureheads, but

they are never secure. There is only one way through which a man can have a permanent hold upon a good position and that is by working for it. It takes work to educate a man, and if he obtains his knowledge in this home-made way it is worth six cases of imported information with the duty paid on it.

* * *

Young man, don't lay around and run in debt for your board waiting for someone to tell you to come to Buffalo and get a snap. Don't swear off drinking and begin again Washington's Birthday. Make up your mind to go to work and pay for your drinks. Work for what you get, it will taste so much the better. Don't pray for somebody's death to give you a few dollars, for money obtained in this way does not go as far as what is gotten by the sweat of your brow, the only legal tender.

How I Improved a Foundry.

S. GROVES, M. E.

(Continued from January issue.)

Michael Angelo once stood in the Sistine Chapel, looking towards the frescoed ceiling, at a figure out of proportion. Suddenly, he stooped down and began to draw with masterly touch. When asked what he was doing, replied: "I criticise not by finding fault only, but by creating something better."

In the December issue of THE FOUNDRY it was my privilege to describe somewhat critically, an iron foundry of considerable dimensions, built in one of our chief cities in recent years, by some well-meaning amateurs: men who had no practical experience or technical knowledge of modern foundry construction, and hence, left behind them a workshop and its appliances, which was a laughing stock for all intelligent foundrymen who chanced to drop that way. But the day is fast approaching when iron foundries like the one pictured will no longer exist in our great iron centers, since, in the struggle for wealth, few capitalists will be found willing to invest $25,000 on a profitless wooden foundry, equipped with antiquated appliances, which might have been thought something wonderful in the days of Tubal Cain, but which are now only fit for the industrial museum, as showing a certain stage in the evolution and progress of iron founding.

In fact, the foundry described no longer exists, for, in the sixteen months during which my services were retained to build up a special branch of machinery molding, I had an excellent opportunity of putting into practice some of the ideas I had gleaned in my 25 years' experience, in some of the largest and best equipped foundries on two continents.

And having this valuable experience, and important data, stored away in the recesses of my memory, the thought occurred to me that it would almost be the "unpardonable sin" to allow products of mental aberration, like the core oven illustrated in my previous article, to pass into oblivion, without being placed on permanent record, for never was the like seen, since Dud Dudley made his first batch of pig iron from coke smelted ores in 1619.

I now proceed, therefore, to set forth in detail the various improvements made in accordance with my designs.

After a few weeks' trial I found it impossible to get along with the larger core oven, for work was delayed and castings were thrown on the scrap heap, causing annoyance to customers and discontent among the molders—who could not earn salt, especially as the place was run on piece work. My illustration of the old core oven indicates that as there was no circulation of air through the oven, so we were forced to shove the core truck right up against the fire-place, consequently the surface of the cores next the hot fire were caked, cracked and burnt, yet wet underneath, while the other side was dense and impervious to ventilation, owing to the slow and gradual process of drying, thus causing frequent "blowing" and "scabbing" of castings. Upon complaining, I was told that improvements had "to come out of profits," but just as the Hebrews in Egypt could not make bricks without straw, neither could we make profits without means adapted to ends. I preferred to build a water seal gas producer, of which I had complete details, and some practical experience, but the first cost made such a scheme prohibitory, and, as we could not get coke under special advantages, I set to work and made a design, involving simply some slight alterations to the existing oven, but in accordance with the best conditions for perfect drying of cores, and economy of fuel.

In the first place, I proposed to lower the oven roof some two feet or more, with a view of utilizing the useless cap of hot air next the ceiling. The roof of the old oven was spanned with T shaped cross girders, the flanges of which rested on the red covering bricks, between which the blue sky could be seen at places, and upon which one could not stand comfortably over the fire-place, thus losing, by radiation, valuable heat, which should have been utilized inside the oven. Instead of setting the girders 10" apart, I proposed to set them at 2'-6" centres, substituting ¾" cast iron covering plates for the red bricks. This plan I had adopted in the building of previous ovens, covering the plates with coarse mineral wool—an excellent non-conducting material, and capping this with puddled clay; by this means reducing the radiation of heat to a minimum. But the cost of plates and mineral wool was an insuperable objection, so I had to be content with red bricks again, and sifted blast furnace slag powder for non-conducting material. Then, I proposed to pitch out the existing raised fire-place, and to tear down the laughable chimney next to it, transferring the chimney to the other end of the oven, providing an outlet therein about 12 inches from the floor, for the exit of vapor and moisture from the cores, and thus inducing a current of air right through the oven, making it almost as hot at one end as the other. The special feature about the fire-place was that the grate is below floor level, the draft being induced through an ash pit underneath, which is carried beyond the back wall, to facilitate cleaning out of clinkers and ashes. Over the fire grate, a recess is built in the back wall, with an arched roof radiating towards the oven ceiling. The advantage of this fire brick process is to absorb the concentrated heat of the fire, and then throw it off as radiant heat, into the body of the oven, instead of subjecting the cores to the fierce, direct heat of the hot fire. In the middle of the recess is a rectangular door, through which the fire is fed, without the attendant going inside the oven. When the fire has kindled to redness the back of the fire-place is covered in, thus shutting off the draft, and reducing the rapid combustion of the fuel.

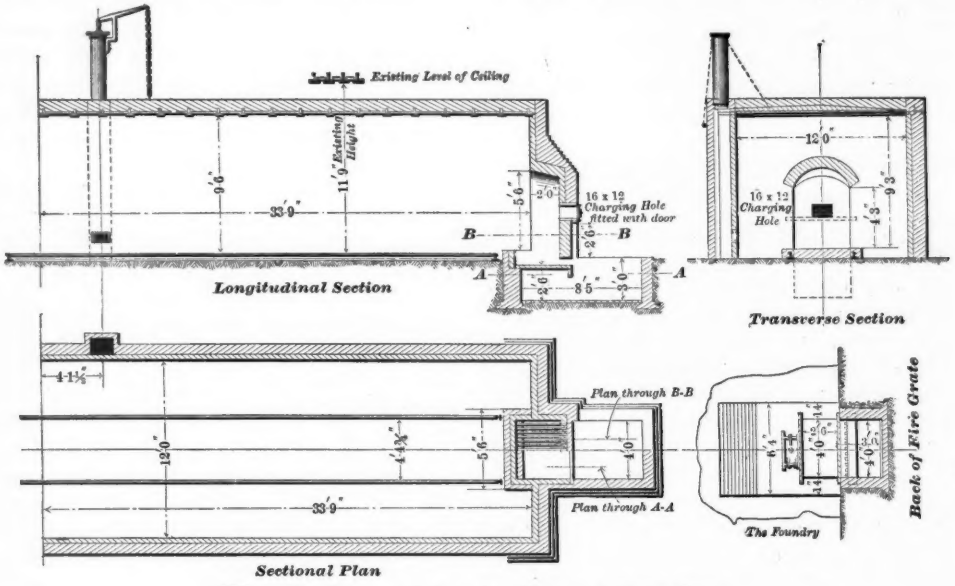


Fig. 2—Plan and Interior View of Core Oven.

The presentation of these cogent reasons led to the alteration of the oven, in accordance with the design illustrated herewith (Fig. 2), and from the day it was put into operation hardly a moment's trouble did we experience in the drying of our cores. When a hot fire was kindled, one could hardly leave one's hand on the oven doors, whilst the fuel consumed consisted of the droppings from the cupola, freshened with a little new coke.

The very nature of these notes of mine preclude any extended philosophical discussion of core oven phenomena, but I can not refrain from supplementing the foregoing data by an admirable passage, bearing on the subject, from Spretson's work on casting:

"A slow current of warm air, not exceeding 450°, or, at most, 450° F, has to be kept constantly passing through the stoves, and carrying off the vapor from the wet cores. Assuming that 1 lb. of coal should evaporate 15 lbs. of water, at the pressure of the atmosphere, and that 1 cubic foot of wet loam contains 30 lbs. of water, 2 lbs. of coal would be enough to effect the drying of 1 cubic foot of wet loam. In order to dry any material in a confined space, it is necessary not only to heat the air in that space, but to change it before it becomes saturated with moisture, otherwise the material is simply steamed and not dried. The fact is shown by D. Alton's experiments, which proved that by having a brisk current of air 36 grains of water per minute could be carried off from the same surface that only gave off about 22 grains of water in a still atmosphere. It would appear, therefore, that a high temperature, with a brisk current, are the most favorable conditions for drying, but with regard to cores and molds, the limit of both is soon reached. Supposing a low temperature is adopted with a very rapid current of air, the surfaces of the loam are very liable to crack, whilst if a low temperature is used with a slow current, the loam, in drying, gradually gets so dense and consolidated as to lead to a probable failure in the casting from "blowing." If, on the other hand, the temperature is forced beyond 500° F, with a slow current, the molds and cores dry unequally, and the steam which is generated splits off pieces, and thus spoils the cores and molds, besides destroying the fibrous hay bands, or loose dung used to bind the loam, etc. The weight of water held in suspension by still air increases rapidly with the increase of temperature; thus, with the barometer at 30°, and the temperature at 32° F, 1 cubic foot of air is saturated with 2.3 grains of water; at 100° F, 19 grains; at 150°, 70.5 grains; at 200°, 204 grains. In order to remove this vapor, a current of dry air is required."

From these scientific considerations, it must be apparent to all intelligent foundrymen that, given the best self-registering thermometer for evaporation, then the ideal plan for heating core ovens would be a system where the temperature was under complete control, and hence, could be increased or decreased at will; such a system, for example, as the Thurman Fuel Oil Burner; or natural gas, or producer gas; but where coke heating is retained, either through peculiar circumstances or conservatism, then the system of heating described in this paper is worthy of serious attention. It is beyond the stage of experiment, and is one of the simplest, most effective, and economical methods of heating core ovens through the medium of coke, in use to-day.

(To be Continued.)

Pokey's Pointers.

Widbur, the superintendent, came over to the foundry the other day wearing the air of a man who feels he has got a bad job on his hands and must get rid of it. Putting his thumbs in that part of his vest where the arms are supposed to pass through, he walked towards Tom Bowers, who was standing at the brass furnace.

"Mr. Bowers," he began, "how is it that we can not get our brass castings of an even color? It can not be allowed to go on in this way. Our engines have a decidedly unpopular tinge scattered about them that leads to considerable ridicule being heaped upon us."

"They have, eh?"

"Yes, it is unpleasant to the eye and appears badly in comparison with other makes. Will you please see that this is stopped, Mr. Bowers?"

"I don't know whether I will or not."

"But you must, Mr. Bowers. We must have our brass castings of an even color or we shall be obliged to purchase them outside."

"We must," said Tom, with a particularly sneering accent on the "we."

"Yes, we got to have them," remarked Widbur, who had found on more than one occasion that Tom could do wonders, if he was threatened with having outside castings brought in. He had found that if he could only get Tom to think about such matters he generally produced a remedy.

"Do you know what you are asking me to do?" queried Tom.

"Yes, sir."

"No, you don't, not this time; you are trying to get something impossible under the circumstances. The only way you can get those castings to respond in color is to paint them."

"Why can't you turn them out like a regular brass foundry does?"

"Because I ain't furnished the material. Whenever you get short of stock, Pokey telephones down to Levy and up comes a wagon load of scrap brass, consisting of old lamps, copper wires from the electric companies, yellow hard brass from the same source, journal boxes, etc."

"And what has that got to do with it?"

"The color of brass depends upon its composition. I don't want to learn you fellows too much, but I see I must say something to defend myself. If I should melt ninety pounds of copper and ten pounds of tin right along you could expect me to have castings of an even color. I could get it that way if you furnished me the right metals. As I said before, the color of brass depends on its composition, and I am obliged now to guess at that, and I am a poor guesser when it comes to mixing metals. How many per cent of copper, tin and lead do you suppose is in this old beer faucet here?"

"Don't know."

"And what is this old gas fixture made of?"

"Don't know."

"Well, how am I to know then? I can't tell by smelling of it, by feeling nor by taking it between my teeth, like a Chinaman does a piece of silver. With the variety of old stuff piled up around me I simply have to guess. If you are a mind to furnish me with copper, tin, zinc and lead in such a shape that I can tell what it is, I will give you even colored brass, and not a darned minute before."

Again Widbur had got a pointer, as he most always did whenever he opened his mouth in the foundry. As he walked away Tom muttered, "We must, we, we, we, oh how us mud turtles do float."

Widbur has developed another mania that most men fall into when they first enter upon a position of authority. He has turned billposter. His first job in this direction was a notice saying: "No Smoking." Why he should put this sign up always bothered the boys, since none of them smoked, for they knew if Egan caught them at it they would have to walk the plank, but Widbur no sooner got through putting up one than he started to design another one, and the boys got to thinking that he intended these for ornamentation. After "No Smoking" came "No Electioneering," and this was quickly made to read, "No Democratic Electioneering." Everybody laughed, except Widbur and an old Irishman who only had one eye, having lost the other one in the old country looking for a job. He was disfranchised from seeing a joke anyhow. The politicians came just the same, and done the usual damage, but where is the crew of men who will refuse the entertainment of a candidate, as long as his pockets are lined with Pittsburg stogies.

Whenever a legal holiday arrived, the day before would come a notice to all employes that the works would be closed. This probably agreed with Pokey's idea of dignity, but the effect on the boys was anything but dignified. Some people can't read, there is more still who can't read a notice. In many shops men act like men without having it put on paper, and Tom is one of these fellows who believes in controlling men without putting porous plasters on the building. If one man happens to do something wrong, why should the whole shop be subjected to a typewritten bulletin? Why not explain to this man the objectionable features of his offense, and if he repeats it, make a living example of him? The power of notices is shortlived; that of a good talking to will outlast ten of them without having a tack put in each corner of it.

"Look out there," yelled Pokey the other night, when he was escorting some ladies through the foundry at casting time. "What do you mean, anyhow?" as a molder recklessly dropped some metal in close proximity.

"Say, Tom," he went on, "what is the matter in here to-night, anyhow? Everybody is rushing around like they were crazy, and look at them slopping iron all over the shop."

"It is caused by human nature, Pokey."

"Come off, Bowers, what has that got to do with carrying iron? If there is a pointer here push it along."

"It is human nature, just as I said," Tom went on. "You see those young ladies over there, that you brought in, they are the cause of it. When you meet a young and pretty lady up town, what do you do, Pokey? You put yourself in a trim that you wouldn't do for the President of the United States. You yank away at your necktie and straighten your pockets out when they look slouchy from carrying tobacco in them. You put on the air of a chevalier, and forget your wife and children. Yes, you do. It is human nature, and is all right as long as your wife don't find it out. There are two things that won't amalgamate with a foundry, Pokey. They are a dog and a female person, and the latter is the worst of the two. Everyone in a foundry likes to show off to visitors, particularly if they come around in petticoats. The latter are so scarce around a foundry that the boys simply become insensible to their surroundings and if it happens to be casting time, they come up to the cupola with an air that says 'Oh, how tough we are,' and handle the metal like it was beer. Before you came in Bob Wilson was laying over there in the sand heap, played out, so he said. Look at him now, jumping around like a wildcat. Some of these fellows may be tuckered out, ready to drop, but they won't own up to it as long as there is a woman in the shop. They have no desire to play the part of a corpse before such an august audience. Every one of them wants to show off, not only the young men, you will notice, but old married fellows whom you would suppose should be beyond the magnetic influence of womankind; but it is the ruling passion; it is human nature. Talk about whisky to bring men to, it ain't in it; give me a woman in the shop and not a mother soul of them will play out as long as she remains.

"Now look at that fellow over there, Pokey, working at that engine base. He is jealous because he has to keep on molding and can't get a chance to show off. Look at him sleeking that bottom, just to show how he can handle a trowel. He is going to make that scab all over the way he is polishing it off. He wouldn't do that but for these women looking at him. He knows better but he falls a victim to female intruders. I must go over and stop him or we will have to break that casting up."

"Well, I will get them out of here so that you can assume your normal conditions," said Pokey, as he escorted the visitors out of the foundry.

Glue for Cores.

One of the boys was once asked if he could play the fiddle, and very innocently replied: "I don't know; I never tried." A great many foundry foremen would probably make the same reply if you asked them if you could use glue in cores: "I don't know: I never tried."

He might even go so far as to tell you it was no good. He might remark he had heard one of his friends who had used it say it would be a good thing if it did not absorb moisture.

However, in spite of all this, glue would be very much more used for this purpose if it was better known. It certainly possesses great advantages for some kinds of core work.

Glue is an animal substance possessing a large degree of adhesiveness. A little of it goes a great ways, and a very diluted solution will suffice to hold the core together; this coupled with the fact that glue generates less gas than any other substance used in the making of cores, makes it desirable as it reduces to a minimum the chances of losing castings through "blowing."

We all know for some kinds of core work rosin is very good, but rosin is insoluble and must therefore be used in fine particles which increases the volume of matter used, and consequently the volume of gas generated. Moreover a core made with rosin is not hard till it has cooled; whereas one made with glue is hard also while hot. Glue has all the advantages of rosin with the additional one of solubility, and less volume.

A solution of glue mixed with ordinary moulding sand yields a hard firm core. It will be harder in proportion to the greater or less strength of the solution used. It is, therefore, advisable to use as weak a solution as possible, increasing or decreasing the strength till one is found which will yield a core just hard enough to stand handling. Of course more or less experience is required in the making up of cores with glue, but as it may be the means of saving many castings,

which might otherwise be lost through "blowing," the gain would be well worth the cost of any experimenting required to be done.

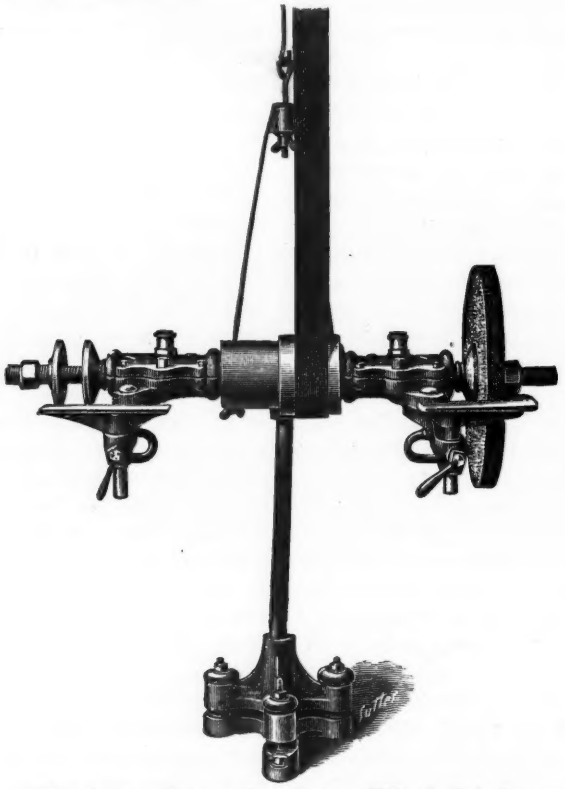
A little practice is needed to know the exact proportion of glue to use, as it varies with different sands, but for small cores or that in which any difficulty is experienced in taking off vent nothing has been found that will excell it. Timmis & Clissold, of Bound Brook, N. J., make a specialty of supplying the trade with an article especially suitable for foundry purposes.

New Style Emery Grinder.

The Diamond Machine Co., of Providence, R. I., are said to be the largest manufacturers, devoted exclusively to the production of grinding and polishing machinery in this country.

Their new factory is bounded by five acres of land; their machinery building is brick, three stories high, is equipped with modern improvements and tools, electric lights, traveling cranes, elevators and every appliance for the convenience of handling their production.

The variety of grinding and polishing machinery produced by this company fills a catalogue of about 180 pages. Many of these machines are covered by letters patent, of which they have the exclusive sale and manufacture.



Huntington Suspension Emery Wheel Grinder.

Among these machines is one known as the Huntington Suspension Emery Wheel Grinder. The accompanying engraving shows its form and construction, which is a radical departure from established notions. It is constructed, however, on strictly scientific principles, taking into account the laws of vibration and the forces evolved or developed by fast running machinery. The machine, as shown, is hung in cushions or springs, and suspended between ceiling and floor by wires or spring rods in such a manner that the emery wheels revolve on their center of grav-

ity, doing away with all noise or unpleasant vibrations, so that a solid wheel under the work feels soft as a cushion, and does away with the wavy appearance on surface work. A great part of the polishing or cutting down heretofore done on leather covered wheels, can be done on solid wheels. With the new machines emery wheels last longer and cut much faster, because the work passes smoothly over the wheel, every particle of emery doing its share of the work. The work does not bump and stutter over the wheel, crushing the grains of emery, and tearing them out without allowing them to cut, as on other machines. The new machine has no cumbersome frame or base in the way, and allows the workman to get at all parts of the wheel and to grind all heavy work on a barrow under it, so that he can see what he is doing.

Manufacturers of stoves or other light castings, which require in handling, room without conflict with the ordinary columns or legs to the regular machines, have found the Huntington suspended grinding machine with its advantages very available for their work. The machines have the testimony of such manufacturers throughout the United States. We publish one from the largest manufacturer of stoves in this country, whose products are known and used the world over.

Office of the Michigan Stove Co.,
Detroit, Mich., May 21, '86.

Diamond Emery Wheel and Machine Co.;

Gentlemen—We have used the Huntington grinder six months. We have found that it wears a wheel perfectly true down to the hub, and has saved us at the rate of ($20) per year on wheels, and at least $5 in repairs to machine. Aside from these advantages there is no jar to building, and the machine is practically noiseless. We estimate the advantage to us to warrant our replacing our old machines with these as fast as practicable, and expect to have the 55 machines mentioned in our order of this date in place during the next eighteen months. Yours truly,

MICHIGAN STOVE CO.,
Per W. J. Keep, Supt..

Could not do without it.

GEORGE BLYTHE,
Dayton, O.

Core Ovens.

AMERICAN GLUTROSE WORKS.

Having been repeatedly asked to suggest improvements in core-ovens, we submit the following, trusting that it may be of interest to some readers of THE FOUNDRY.

Core making is one of the most important branches of the foundry business. If the cores are not right, the castings will not be right, no matter how skillful the molders are, yet we have seen but few core ovens in the whole country that are arranged to turn out quick, reliable work.

A large percentage of cores are spoiled in the ovens. All cores contain more or less water, and the fact is often overlooked that water boils at 212 degrees Fahrenheit. Yet we find cores placed in ovens where the temperature will reach 500 degrees Fahrenheit. In all such cases the cores get a severe steaming, particularly the small cores and the light parts of the large cores. This makes the parts that have been steamed rotten; they can't be handled and when placed in the mold they will cut and wash by the metal, making a defective casting. It is always the small cores and the parts of all cores of most importance (that is, the thin and light parts, corners, etc.) that are most affected by the steam, because those parts are dried first and after a core is dry and ceases to throw off steam itself, it is more easily affected by steam from other sources.

The general method of building core ovens now is to place the fire within the oven and making the flue inside the oven just large enough to carry off the gases from the fires and no larger. Then the oven is filled with cores and as hot a fire as possible is started. The oven doors are closed and in many cases all the joints and cracks about the doors are stopped with clay, etc., as though it was essential that the atmosphere within the oven should not be disturbed, but be kept perfectly still. Now the extended experience which we have had in fitting up and running not only core ovens for foundry purposes, not only "drying machines," but in fitting up whole buildings of three and four stories for drying textile goods and large masses of drugs and chemicals, where the temperature must be kept at a proper degree and very uniform throughout the entire building, has

taught us that the best and quickest drying of any kind is effected where the air and hot gases are kept on the move. This is a law of nature. Take, for instance, a field of grain, a muddy road, or a line full of wet clothes. All these and all other wet articles will dry quicker and better on a windy day, although comparatively cool, than they will on a still, calm day under an intensely hot sun. Why? Because a current of air (particularly hot air) carries the moisture away before the dried parts or particles have an opportunity to absorb it again, and it is the same with cores in an oven. Under this treatment you simply dry them uniformly without destroying or steaming the corners and light parts, and without destroying the material used to hold the sand together.

The system we have used and recommend for heating core ovens is the same we have used in drying starch in 40-ton lots (although a little more heat can be used in drying cores) and is as follows: Place the fire outside of the oven but close and alongside of it. Arch over the fire with iron pipes or retorts, so arranged that any or all of them can easily be replaced. On the end of these pipes futhest from the oven attach a small high-speed blower which can be placed overhead out of the way. Now run the opposite end of the pipe into a brick flue built inside of the oven against the walls on the floor and running all round the oven except across the door. Make this flue at least three times the area of the opening at the fan and leave a brick out of the flue at intervals all around the oven and on the floor line. These openings should equal the area of the flue.

Arrange the oven with a door in the top, which may be opened more or less (according to the number of cores in the oven) to allow the steam to escape. By this plan the fan forces cold air through the pipes where it is dried and heated as hot as required, passing into the oven dry and hot and with currents of air all over the oven rising to the top, carrying all of the steam with it, the cores will become thoroughly dry and strong in a much shorter time than can possibly be done by any other arrangement. By this plan it will be seen that as all the hot air is discharged into the oven all over the floor, and receives no additional heat after entering the oven, all parts of the oven will be heated uniformly within one or two degrees.

This plan may seem an expensive one, but the opposite will be found to be the case, as the cores will come out of the oven quicker and in the best possible form, while the fuel saved will very soon pay for the entire outlay.

New Foundry Enterprises.

E. A. Keene, of Malden, Mass., will start a foundry there.

Ammon Collier is building a foundry in Elizabethville, Pa.

The American Bedstead Co. are erecting a foundry 40x50 in Westboro, Mass.

There is some talk of J. A. P. Berg starting a new foundry concern in Moline, Ill.

The Walker Foundry Co., of Erie, Pa., is to add an addition, 72x100, to its plant.

N. S. Bouton & Co. will build a car wheel foundry at Birmingham, Ala., to cost $100,000.

The Standard Stove and Range Co. will erect a large stove foundry at Terre Haute, Ind.,

The Pittsburg Car Wheel Co. will expend, it is said, $150,000 on a wheel foundry in Pittsburg.

Cooper Bros., whose foundry was recently destroyed by fire at Cortland, N. Y., are rebuilding.

N. E. Strout & Sons, whose foundry at Bedford, Ind., was destroyed by fire recently, will rebuild.

The Midland Foundry & Machine Co., at Denver, Col., will erect foundry and machine shops at a cost of $40,000.

Griffin Wheel Co., of Chicago, have purchased the business and plant of the North Western Wheel & Foundry Co., of St. Paul, Minn.

It is said that a new wheel foundry to build all the wheels used on the Pennsylvania railroad will be built this year at Altoona, Pa.

The Putnam Foundry and Machine Co., of Putnam, Conn., will rebuild their foundry and machine shop recently destroyed by fire.

The Walker Foundry Company, of Erie, Pa., are to make an addition to their plant,

72x100 feet, and the pattern room is to be enlarged and a new office built.

The Cleveland Malleable Iron Co. have purchased a machine shop and foundry at Muskegon, Mich., which they will turn into a malleable iron foundry, employing, it is expected, 400 men.

The Lexington Stove Foundry, sold at auction a few weeks ago, has been purchased by a company of Lexington men, who intend to organize a new company and make it a success. It is said that Mr. Otis W. Snyder will be manager.

The Barnes Mfg. Company have been organized at Mansfield, Ohio, with a capital of $100,000, for the purpose of manufacturing iron and brass pumps. The concern expect to be in full operation by February 1, 1896, the buildings, consisting of a foundry and machine shop, engine and boiler plant, etc., being already in process of erection. F. R. Barnes, formerly secretary of the Humphreys Mfg. Company, of Youngstown, is secretary of the new company.

Sherwin & Miles, proprietors of the Enterprise Foundry Co., at Muskegon, Mich., are erecting a new foundry. Main building, 50x100 feet; large core room with core oven 10x10x30 feet; cupola room with a 54-inch cupola; also chipping room, shipping room, pattern storage room and office. All the buildings are of white presed brick with corrugated iron roof and it is expected it will be one of the most modern foundry plants in the country when completed.

I shall never do without it as long as there is any way of getting it. I am better pleased with it now than ever.

S. C. BANCHMAN,
Durango, Col.

Personal.

T. A. Vaughan, a foundryman well-known in New Orleans and the south, is in charge of a foundry at San Jose, Costa Rica, S. A.

John A. Armstrong, for the past sixteen years with the Hurlbut Mfg. Co., Racine, Wis., has severed his connection with that concern and purchased an interest in the Racine Iron Co., of which he will become treasurer.

William Fitzpatrick, who represents J. W. Paxson & Co. in the west with headquarters in Pittsburg, reports having had a good season and seems to think that 1896 is going to bring him considerable business.

It has been said that Cleveland, Ohio, turns out more foundry foremen than any city of its size in America. If true this is probably because of the number of foundries and the fact that all kinds of work are done there. One of the last to graduate has been John Lougheed, who is and has been for some time successfully filling the position of foreman at the Globe Foundry in Detroit.

Among the Foundries.

Bunce's Foundry will be removed from Natchez to North Yakima, Oregon.

O. B. Alderman has sold his foundry at Nevada, Ia., to Geo. W. Ashford.

Wolff & Zwicker have purchased the Vulcan Iron Works at Portland, Oregon, for $6,300.

W. T. Thompson purchased the Edinburg Foundry and Machine Shop at Edinburg, Ind., recently.

Christopher Van Buskirk has succeeded to the firm of Van Buskirk Bros., general founders and machinists, at Little Falls, Minn.

Alexander Bros., of Murphysboro, Ill., have disposed of their business to John W. Lewis, formerly master mechanic of the Chicago & Texas R. R.

The Anderson Foundry and Machine Works at Anderson, Indiana, recently cast a 32-ton iron table for the American Plate Glass Co., of Alexandria.

Mr. J. H. Bass, proprietor of the Bass Foundry and Machine Works at Fort Wayne, Ind., reports having contracted for over $2,000,000 worth of work in thirty days recently.

The Midvale Iron Foundry's plant at Allentown, Pa., will be enlarged by the erection of a brick addition to the main building, 80x 100 feet, along the Little Lehigh river.

The Griffin Car Wheel Company now have their new Denver foundry in operation. It is one of the best equipped foundries in the country, labor saving machinery having been

introduced throughout the plant. This foundry is in a position to serve a wide expanse of territory, reaching practically from the Missouri river to the Pacific coast.

The Garden City Foundry Company, successors to Turner, Dickinson & Co., are arranging to concentrate their entire business at Cragin, a suburb of Chicago. A building to be 64x100 feet is being erected for a machine shop to finish the castings made in their foundry near by. They not only handle general foundry and machine work, but have a bronze and nickel plating department and intend to add japanning ovens. Their specialties are hangers, friction clutches and piano plates. At present a portion of the work is done at 76 Churchill street, Chicago, but by January 1 everything will be done at Cragin.

I like THE FOUNDRY very much and would not be without it.

WILSON WEBB,
Dallas, Oregon.

Fire Fiend.

The Bernville Foundry at Bernville, Pa., was burned December 24. Loss, $4,500.

G. W. Menough, of East Liverpool, O., suffered from a $2,500 fire in his foundry December 25th.

The Austin Foundry and Machine Shops at Austin, Texas, were destroyed by fire December 19th.

The Empire Foundry and Harvester Works at Marysville, Cal., were totally destroyed by fire December 20th.

The Putnam Foundry and Machine Co., at Putnam, Conn., was destroyed by fire a few weeks ago.

The Parishville Iron Co.'s foundry at Ashland Wis., was destroyed by fire December 10th.

The Hassell-Talcott Foundry and Iron Co., Colorado Springs, Col., was destroyed by fire January 13th. They will rebuild at once.

J. Woodruff & Sons' Stove Works at Salem, O., were recently destroyed by fire. Loss, $30,000.

The foundry of the Weir Plow Co. at Monmouth, Ill., was destroyed by fire December 12th. Loss, $200,000. The company recently decided to remove to Moline.

I am well pleased with THE FOUNDRY and think it very instructive as well as interesting to foundry men generally.

ARTHUR COUNCIL,
Quincy, Ill.

Books, Exchanges, Catalogues, &c.

The J. D. Smith Foundry Supply Co. send us a large envelope full of very ornamental blotters that are quite effective as a method of advertising.

The "Tradesman Annual" was up to any expectations that might have been formed concerning it. If it can be regarded as an indication of southern enterprise or prosperity, the south is to be congratulated.

"Dixie," with its fine typographical appearance and the excellency of its makeup, has established the fact that it pays a trade journal to be artistic, and the compliments that are continually paid its management were doubly deserved in this issue.

E. M. Ayers, of Zanesville, Ohio, makes us his debtor for a very handsomely printed and illustrated souvenir of that beautiful town in which we notice with pleasure an extended reference of the large molding sand business done by that concern.

Ex-President Harrison receives a larger sum for his articles on "This Country of Ours," which he is writing for the Ladies' Home Journal, than has been paid to any public man in America for magazine work of a similar nature. His first article, in the Christmas number of the Journal, sold over 100,000 extra copies of the magazine, of which 725,000 copies were printed as a first edition.

The holiday number of the average trade journal is rapidly becoming a fixed institution—looked for by readers and advertisers alike. This year those journals devoted to the interests of the iron trade or its branches excelled all previous atempts and the results were highly complimentary to those in charge. It was only natural of course, that in a matter of this sort the Iron Age should take the lead, which it did with an issue containing nearly 300 pages.

Its principal features were of a retrospective nature and its leading editorial from the pen of its owner, David Williams, dealt with its history from its birth in 1855 to the present time. It contained also many very interesting extracts from various issues of the paper during the past that afforded the reader considerable information as to the progress made in the field it has so ably covered from its first issue.

Carefully prepared diagrams illustrating the fluctuations in production and price of America's leading metallic productions added much to its value.

We doubt very much in fact the ability of any trade journal on earth to equal this magnificent issue and everyone interested in the iron business in America should feel a sense of personal pride in looking over its pages.

We are under obligations to Rogers, Brown & Co. for a neat compound automatic duplex self-registering, open-faced, watch-shaped apparatus for keeping track of our expenses. As it is supposed to only record cash transactions and we never pay cash, it will doubtless serve as an ornament for a long time to come. Seriously though, it is a very useful as well as an ingenious contrivance that should be in the hands or pocket of all their customers and friends, which is nearly the same thing.

F. B. Stevens, of Detroit, has long been noted for the originality of his advertising methods. His latest is in the form of a neat purse accompanied, of course, by some original lines from the pen of the gentleman himself as follows, and wishing all his friends a Happy New Year. The lines referred to are:

A man can do without neckties and gloves,
can even get along without ladies or loves;
but to jog thro' the world is neither pleasant
nor funny, unless well supplied with the stuff
called—MONEY.

Those who know the gentleman best will agree that it would be a case of unusual hardship were he deprived of any of the foregoing. Mr. Stevens is too well bred to intimate such a thing, but of course it is understood that the purse is to hold the money that can be saved by buying foundry supplies of him.

The Iron Trade Review, which has built up a field and reputation for itself in the central and western states especially, has also gone into the holiday number business with considerable energy, and its New Year's issue showed that it had many friends. The American Machinist celebrated the occasion in a different way. In the first place it passed into new but thoroughly experienced hands. Angus Sinclair and John A. Hill, proprietors also of Locomotive Engineering, have become president and treasurer respectively, while Fred J. Miller is vice-president and editor. In adition to this it donned a cover, increased the number of its pages and made a few other changes that should be seen to be appreciated.

Henry M. Stanley, in an article on the "Development of Africa," which is to appear in the February Century, recalls the fact that troubles with the Boers in southern Africa first induced David Livingstone to travel to the north, and so led the way to the opening of equatorial Africa. Livingstone, who was a missionary at Kolobeng, accused his Boer neighbors of cruelty to the natives. They resented his interference, and threatened to drive him from the country. He published their misdeeds in the Cape newspapers, and his house was burned in revenge. This led to his leaving southern Africa and going to a region where he could follow in peace his vocation as a missionary, unmolested by the Boer farmers.

The initial article in Harper's Magazine for February will be a description of the city of Baltimore, by Stephen Bonsal. The article will be found to be appreciative, full of valuable information, and well illustrated. Mr. Bonsal's intention is expressed in the following terms: "It is well-known that the fame of Baltimore rests upon the valor of its citizens, the beauty of its women, the excellence of its cookery, the number and beauty of its historic monuments, and the possession of an excellent mayor, who has presided over the destinies of the city during eight terms (sixteen years). In the following pages I shall attempt to dwell upon these and other features of the city's life, which excite always the admiration and sometimes the envy of the visitor from a less-favored community."

CAST IRON NOTES.

Devoted to Inquiries from Practical Foundrymen on the subject of Melting and using Cast Iron. Address all Inquiries to W. J. KEEP, care of The Foundry.

Can I learn to analyze Cast Iron, and learn the different properties of Cast Iron, and can I learn this by correspondence?

Even to be able to determine the ordinary elements in cast iron would require a course of instruction in a laboratory. The greatest accuracy is necessary in every detail, and to realize what accuracy is requires previous training. You would require a suitable laboratory and an outfit which would cost several hundred dollars.

To become at all expert you would be obliged to spend all of your time at this work. You could not make it a side issue. If you were to devote time to other matters you would probably never devote enough time to chemistry to enable you to do accurate work.

If you need analyses of iron it would be cheaper to arrange to have a chemist of recognized ability do the work for you.

Knowing the chemical composition of cast iron would give you very little idea of its chemical or of its physical qualities. No chemist has yet been able to show any very close relationship between the chemical composition and the physical character of cast iron. The physical qualities must be determined by physical tests. The best way to study cast iron is to get an autographic testing machine and break test bars.

All the chemistry that a founder of gray castings needs to know is, that to make strong, light castings he must keep the silicon rather high, and to make strong heavy castings he must keep the silicon rather low.

What is the difference in the quality of the final casting when it in softened by an increase of silicon, or by annealing.

The usual cause of hardness in cast iron is the presence of combined carbon. In melted iron all of the carbon is combined. Just as a casting cools to a red heat some of the combined carbon changes into graphite. The longer the casting remains at a bright red heat the more carbon will change, but a very small casting loses its red heat in a few seconds. The greater the percentage of silicon, up to about 3 per cent., the more rapidly will this change of carbon take place. For small castings the silicon is kept high to cause as much as possible of the carbon to take the form of graphite during the short time that the casting is at a red heat. The softening influence of silicon is entirely due to its causing a decrease of combined carbon. Silicon of itself hardens a casting and makes it stiffer. If the carbon could be made graphitic without the addition of silicon the iron would be still softer. This is the reason that dark colored low silicon pig iron is so soft and hard to break. Its carbon was changed to graphite by slow cooling. When remelted and poured into small castings, such iron will be white, weak and brittle, because the carbon changed to graphite so slowly that during the few seconds hardly any became graphitic.

For the most perfect small castings the iron must contain enough silicon to make it gray. If such castings are reheated and kept at a steady red heat for several hours, the carbon will nearly all turn to graphite. The annealed casting will have a very close grain because low silicon always makes a close grain.

Annealing does not materially increase the size of the grain, but the carbon which was chemically combined with the iron separates, and is deposited in the spaces between the grains. This black graphite gives annealed castings a very dark fracture. After the carbon has left the iron and has dropped into the spaces between the grains, the remaining iron is nearly pure and is therefore very soft and ductile, and graphitic carbon has no hardness.

A casting containing much silicon is as fully graphitic as an annealed casting, but the silicon seems to be in part or wholly combined with the iron, which hardens and stiffens it.

An annealed low silicon casting is therefore softer than a casting having high silicon, though the graphite may be the same in each. For the same reasons an annealed casting will not be as strong as a casting softened by increasing the silicon.

The following examples illustrate this:

Test bar, ½ inch square, 12 inches long.	Shrinkage.	Chill.	Strength.	Deflection.	Total Carbon.	Graphite.	Combined Carbon.	Silicon.	Phosphorus.	Sulphur.	Manganese.
½ in. sq. bar, not annealed...	.155	.14	425	.27	3.77	3.32	.45	1.78	.50	.041	.568
½ in. sq. bar, annealed.....	096	.07	400	.35	3.77	3.68	.09	1.78	.51	.043	.568
½ in. sq. bar, soft'd by silicon	.123	.05	427	.24	3.13	3.03	.10	3.51	.98	.088	.500

The annealing of gray iron castings is not at all like the annealing of malleable iron castings. The latter are white iron castings, packed in iron rust of some kind, and kept at a bright red heat for several days, until a portion of the carbon is removed from the surface of the casting, and it becomes partially malleable.

Gray iron castings are annealed by packing them in burned molding sand, or charcoal dust, or wood shavings, and keeping them at a bright red heat for about 12 hours. This gives the carbon time to slowly separate. With 3.51 per cent. of silicon the carbon turned to graphite as completely as in the annealed casting in less than one minute's time. Softening by silicon is not so sure a process as by annealing, therefore when the cost of the casting is a small matter compared with the tools with which it is shaped, it is better to resort to annealing.

The Western Foundrymen's Association.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, January 15, 1896, at the Great Northern Hotel, Chicago, Ill. The President, Mr. John M. Sweeney, occupied the chair.

The Secretary read the following topical questions, which were open to discussion by the Association:

(1) Does the employer derive any benefit from compelling molders to remain in the foundry until quitting time, if their molds have been poured off before? If so, what benefit?

(2) Are there characteristic conditions in foundries which necessitate different practice and management from those followed in other industrial pursuits?

(3) Is a molder in fit condition to do further work after he has poured off his day's molding?

(4) Is it desirable to have a recognized apprenticeship system, and if so, what is the best form?

The Secretary read the following papers in response to these questions, one by Thos. D. West, of Sharpsville, Pa.; Martin Fox, President of the Iron Molders' Union; Mr. A. Sorge, Jr., and Mr. Eugene W. Smith:

MR. WEST'S PAPER.

In replying to your request for an answer to the four questions to be presented at the coming meeting, I would to the first, in cases where employers have found such a rule necessary, say, "Yes." The benefits derived consist in securing sufficient help to often properly and safely pour off and shake out the "tail ender's" work. In many respects it is but justice to the majority of the shop's crew, as the rule is one preventing partiality to employes as much as to ensure good results in obtaining castings and lessen destruction to shop tools.

To the second query, I would say, "Decidedly so."

To the third, I am in answering carried back to my own days of journeymanship to recall my feelings, which I can describe as not being very enthusiastic to start molding after I had finished pouring off a day's, week's or month's work. There is seldom anything gained by compelling a molder who has molded seven or eight hours to start again after "pouring off" to fill time for ten hours' work. More is gained by inducing extra exertion before the "pouring off" and then, if he has had good success, let him rest on his laurels; if not, let him have the

*Just as THE FOUNDRY was going to press with its last forms we received the report of the last meeting of the Western Foundrymen's Association. As the brief papers presented and the discussion that took place were of such an interresting nature we make a special effort to give it to our readers.

time to meditate on his misfortune, and he will be the better able to start fresh his job the next morning to secure good work. After supper and half an hour's rest, a molder can, in case of necessity, do work much better than to start in right after pouring without rest, as I take it to be the sense of the inquiry.

Yours truly,

THOS. D. WEST.

MR. FOX'S PAPER.

I feel called upon to acknowledge your courtesy in inviting me to express my views upon subjects which, though they may be said to be of minor importance in our general relations as employers and employes, are nevertheless full of the most vital interest to those who follow the trade of iron molding.

I feel, that the fact of your inviting a representative of the other side to take part in the discussion is indicative of your desire to treat the subjects in a fair and impartial manner; that you are prepared to set aside any preconceived conclusions you may have arrived at, and, recognizing our mutual interest, by friendly discussion seek to harmonize our views and come to a decision founded upon wisdom and justice.

It is not my object to use this opportunity to intrude upon your notice, subjects, upon which, perhaps, our opinions may be more widely divergent; but I may be pardoned if I express the hope, that the friendly spirit manifested by you upon this occasion will at no very distant date, evolve a method of settling our differences, be they ever so acute, alike, more creditable to ourselves, more mindful of our interests, and more in harmony with the intelligence and enlightenment of our generation.

It is impossible, in a paper necessarily brief, to cover every point that could be advanced on the topics before us. From the differing conditions to be found in the various foundries of the country, I warn you at the outset, that we can formulate no specific rules or regulations that would operate equally well in all.

The first three queries in your circular are so intimately related, that they might fairly be treated as sub-divisions of the one subject. For convenience sake I will start out with the question scheduled 2:

"Are there characteristic conditions in foundries which necessitate different practice and management from that followed in other industrial pursuits?"

Unhesitatingly, I answer in the affirmative. Before the association composed of practical foundrymen thoroughly intimate with the working conditions in the foundry, it seems superfluous to go into any elaborate argument in defense of my answer. Every one of you know, every one of you in the administration of your business has observed, that the foundry stands out peculiar in its inherent conditions as compared with the other departments. A molder's work-day is divided into two distinct sections, the first the preparatory; the second the completing, or perhaps, to be more technical, the "pouring off." In the first of these subdivisions the molder, generally speaking, may be said to be on equal terms with the machinist, the blacksmith, or the boiler-maker, who at the blow of the whistle or ring of the bell can lay down his tools and go home. But there the similarity ceases. The second subdivision imposes conditions quite the reverse. In it the molder's work, if you will pardon a platitude, is done when it is done, uninfluenced by either bell or whistle. The elements, the fuel, the character of the work, the unforeseen, all combine to render a definite computation of time impossible. The molder during cast-time is much like the hungry man in a busy restaurant, who may be consoled with the reflection that there is food in the kitchen, but must wait his turn to get it; he may be ready for his iron as soon as or before his neighbor, he may be hungry for it, but he must wait his turn as determined by the foreman. While these waiting ones cannot be said to be working, it may be truthfully argued that

"They also serve, who only stand and wait."

One more word. Did it ever occur to you that the molder's work of the previous day will oftentimes wield considerable influence over that of the present? Have you gone into your molding shop in the morning and gazed upon the hot and unsightly heaps of sand and castings that greet you? Have you noticed the vicious hiss when water is applied? Have you noted the steam arising from the mold later in the day when the pattern has been withdrawn, or marked the

beads of perspiration standing out on the forehead of the molder? Or again on a cold day. Have you seen him on his knees on the damp, cold floor? Have you seen him vigorously flap his arms to restore the circulation and warmth to his benumbed fingers, or put on his vest to shield himself from the draught of the big sliding-door? Have you looked on these evidences as united appeals to your kind consideration, and as serving to point out some difference of conditions from other departments?

But to resume our argument. The molder has got his iron and is ready to shake out. The temperature is rapidly rising and the air becoming polluted with gases and smoke. Vigorously he plies the sledge and frees the sand from his boxes, till at last he is finished and with palpitating heart and sweat oozing from every pore, he crawls to the yard, if it be summer-time, for a breath of fresh air and a much needed rest; or if it be winter, gropes his way through the steam and smoke to the water tank for a dip into its welcome coolness. Look at him! Do you think him in a fit condition to do any further work? Frequently I have gone myself, after "pouring off," to the assistance of some unfortunate who was behind with his job, and been surprised at my uncertainty of touch, and nervous, quivering hand, due to the great physical and mental strain to which my body had so recently been subjected. And as "A fellow feeling makes us wondrous kind," I, together with those of you who are practical molders, will assuredly support the contention, that the exhausting, suffocating nature of the molder's final labors totally unfit him to do further work.

And now we come to the consideration of the third proposition as stated inquestion 1, viz.: Does the employer derive any benefit from compelling molders to remain in the foundry until quitting-time, if their molds have been poured off before?

I feel that this is a question of considerable delicacy, that every shop may furnish a different set of premises from which to argue, and that our verdict must be dictated by common sense and humanity, and not by what seems to be legally right in the light of the "pound of flesh" doctrine as propounded by Shylock.

In the smaller shops, where molders are required to pour for one another, to feed, or render such other mechanical assistance as the casting period requires, they as a rule, will be fairly well employed till within a few minutes of quitting-time. In such instances, it seems to me picayunish on the part of an employer to insist on their detention in the shop.

In large, well-appointed shops, we find these peculiarities of the molding shop more strongly accentuated. I know of shops in this country where some of the molders are often through with their work as early as half-past four. These, of course, are exceptional cases, but frequently I have found them poured off and finished an hour before quitting-time. To the live superintendent, ever watchful to stop all leaks in his establishment, this may be looked upon as an unpardonable waste, and the question naturally occurs to him: What can I give this man to do to make his time profitable for the firm? I said this was a natural question, but I should have qualified that statement by adding, "on the part of the superintendent unacquainted with the peculiar conditions of the molding shop and the physical state of the molder as previously described." The competent foreman will endeavor, as far as possible, to avoid unnecessary waste of labor; but to arrange his blast so that every man will be full engaged during casting time and will be through with their work within a few minutes of the blow of the whistle is, from the nature of the case, an impossibility. There must, therefore, always be more or less enforced idleness amongst the men individually from the time the blast goes on till quitting time. In some cases this idleness will be before pouring off, in others after. It is an idleness unavoidable, though non-productive. The former an idleness of expectancy, the latter of completion. In the first case the man must remain; in the second, why should he, unless his presence be required, for the proper performance of the duties of the others? I am of the opinion that a firm having confidence in their foreman's ability to run their foundry to the best advantage, is profiting nothing by imposing restrictions of this kind on their molders when their day's work has been completed and there is no further need of their services. I have no sympathy for

the man who, himself finished, selfishly goes off and leaves a fellow workman to struggle through short-handed, but I have sympathy for a man who is compelled to remain under such unfavorable conditions when his presence profits no one. I detest the shirk, and sometimes he may take advantage of a well-intentioned employer, but you have the remedy in your own hands. I present to you the principle, gentlemen, that when your interests are not being affected the comfort of your employe should be your first consideration.

In summing up my argument on this question I would submit, that the most casual observation will serve to show that the practice and management applicable to other industrial pursuits cannot be successfully applied to the foundry, and that any system that may be devised for its government or control must be made to conform to the conditions therein found, and not the conditions to the system. That while there are periods of unavoidable and seemingly unprofitable idleness, it must be borne in mind that the men who are habitually poured off early in a large shop, work during the early portion of the day at a greater rate of speed and a higher pressure than those who have to wait longer for their iron, and that, as has already been demonstrated, neither the shop conditions nor the physical state of the molder being conducive to productive labor, no good purpose is served by the further detention of the men after the pouring off.

Very truly,

MARTIN FOX.

MR. SORGE'S PAPER.

Questions 1, 2 and 3 are so closely related to each other that a discussion of one necessarily involves all three. It appears to me that the difficulties hinted at in these questions are all due to the fact that the great majority of foundries are to-day run on the same principles that prevailed in the old days when the guilds controlled the various crafts. Molders are expected to be competent and to perform all the details of work occurring in a foundry. The demands made upon them have increased very largely in numerous directions. In all other trades it has been found expedient to divide the work when the progress in the trade called for too great a diversity of skill in the individual. We so find that specialists in particular portions of each trade are the order of the day, except in foundries. True, a partial division has gradually crept in even here, so that we now have stove-molders, bench-molders, loam-molders, etc., but these divisions still involve for each individual the skill and labor of tempering sand, molding, pouring off, shaking out, etc. It will be admitted that more and better work can be done by a workman whose thoughts and energies are directed continually to one end, than by one who is obliged to divide his attention and who attempts to become expert in numerous directions. The latter surely results in mediocre performance all around instead of preeminent excellence in any one direction. It, therefore, appears to me that the step which it is necessary to take in order to start the foundry trade in the direction of rapid progress, is to relieve the molder of all work except molding. The molder, when he engages with an employer, impliedly contracts to work during the ordinary daily working time. It is, therefore, incumbent upon him to be prepared to fulfill this implied contract if called upon. On the other hand, under the present system of running foundries, the molder is ordinarily not in a fit condition for further work of value after he has poured off. Furthermore he is frequently required to remain after the usual quitting time, and no remuneration is allowed him for this in many cases. This condition of affairs naturally breeds discontent, either on the part of the employer, if the man finishes his work before the stipulated working time has expired, or on the part of the man, if this time is exceeded. These causes of discontent will be removed when the men know just the work and length of time of labor expected of them, and the employer realizes that he is obtaining full value for the pay rendered. In other words, the contract between employer and employe in the foundry will no longer be indefinite and implied, but will be accurately defined, when we employ molders for molding only and have all other work, such as shaking out castings, tempering sand and pouring off, etc., performed by specialists who shall be trained to the particular work required of them. Not only will this lead to a better understanding between employer and employes

but the efficiency of the workmen who do the special work of any kind will be largely increased.

As matters are run now in the larger number of foundries I do not think that molders are in a fit condition to do further work after having poured off a large day's work, and, therefore, I do not believe employers derive any benefit from keeping them after pouring off, unless on special occasions when they can assist their colleagues in completing the day's work. A competent foreman is the best judge of the necessity of a molder remaining.

The characteristic conditions now prevalent in foundries and which necessitate different practice and management from those followed in other industrial pursuits are due to the adherence to the old system of craftsmen who are expected to be competent in numerous directions. Divide the labor and this falls away and puts foundry work in the line of modern advancement. As a first step towards this end limit the molder's work to molding. A. SORGE, JR.

To the Western Foundrymen's Association:

In answer to the questions presented by your committee I respectfully submit the following:

1. Yes, under certain conditions. I think it would be advisable to hold all help in foundry until the bottom is dropped, which should be considered as the proper time for quitting in foundry practice. One done all done, provided all help may be used in pouring off the work; also that the melting is done systematically, and where the melting should happen to overreach the regular quitting time it should be offset by the times in which the bottom had been dropped ahead of regular quitting time. The molder should be allowed to go home, providing all work had been poured off and tools and places were left in proper condition to resume work without loss of time the next morning.

2. The characteristics of foundry work are such that you may resume work at regular times, but circumstances interfere with a regular quitting time.

3. I do not think he would be in condition to work at molding.

Yours truly,
EUGENE W. SMITH.

After the reading of the papers a very interesting discussion took place, participated in by nearly every one present, and which those taking part agreed apparently that after the molder had finished his work—poured off and shaken out his floor—that it was not in order to ask him to unnecessarily remain or do further work that day.

The Philadelphia Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, on Wednesday, January 8, the president, Francis Schumann, occupying the chair. The executive committee reported that they had had under consideration the subject of an organization for the protection of foundry interests referred to them at the last meeting, but could only report progress. Another meeting of the committee would be necessary before a full report could be made. The committee thought that the present year would be a good one for the foundry business. The fixing of prices was a very important matter, and when it was taken into consideration that every foundryman would get business at the best price he could, it was a matter of importance that he should know the cost price of his castings. One of the objects of the Foundrymen's Association was the procuring of information for those who did not know how to get at the cost of their castings. Papers from time to time had, they pointed out, been presented on different sections of foundry practice, and there had been discussions on cupolas, molding machines, cranes, etc., as well as on labor costs, so that foundrymen attending the association meetings might, if it were desired, pick up a large amount of information of use in the conduct of their businesses. It had been charged, the committee said, that a member of the association did not get a higher price for his castings than a founder who was not a member. In the main the charge was correct. The association had never made a price at which castings should be sold, as it was not believed that such a course would prove successful. But when a foundryman had learned the cost of his work it would seem unreasonable to suppose that he would wish to sell below cost.

At the conclusion of the report some little discussion ensued in regard to the unbusinesslike competition frequently met with in the trade. Mr. Schumann believed that the anxiety of some in the trade to get work for their shops was something which would excuse them to a large extent. It was getting to be a case of the "survival of the fittest." Purchasers seemed willing to take advantage of the fact that they could readily create a panic among foundrymen in Philadelphia. He related incidents tending to prove that in many cases foundrymen made needless reductions in the price of castings. P. D. Wanner, of the Reading Foundry Company, said they had all heard so much regarding the survival of the fittest during the past few years that every man believed he was the fittest and of necessity should survive. He did not think the prices of castings could be regulated through the association, particularly during such times as had of late been experienced. If all in the business were running on specialties it might be done, but there was too much general work in the business. But he thought foundrymen could work together in some way which would tend to reduce the practice of cutting unnecessarily. He instanced cases where much benefit and good feeling had resulted from an understanding between founders when figuring on certain large contracts. But he said it had been very difficult to hold them together afterward. Jealousy and envy invariably upset anything like a beneficial arrangement. He had seen cases where, at iron pipe lettings, founders had made bids all the way from $2,000 to $30,000 below the next lowest bidder. This difference would seem to be ridiculous. As far as the cast iron trade was concerned the past year had proved better than 1894, and 1896 would probably be better still. It certainly would if pipe founders would demand the margin they should have. It was not for the benefit of the country that manufacturers sold their products at the bare cost.

Mr. Moore, of Elizabeth, N. J., and Mr. Lombard, of Augusta, Ga., also took part in the discussion. Mr. Moore, in the course of his remarks, stated that founders complained of the neglect on the part of architects to specify the weight per foot of building columns. The founder who could cast the thinnest columns would get the work in almost every case where weights were not specified.

There being no papers before the meeting, owing to the holiday season, the remainder of the evening was spent in a discussion as to the arrangements made by members of the association in regard to apprenticeships. Much information was elicited, and it is intended to use the same in a paper to be presented at the convention of foundrymen to be held in Philadelphia in May next.

The Clinton Iron & Steel Company, Pittsburgh, Pa., and the Ingersoll Sergeant Drill Company, Easton, Pa., were elected to memberships in the association.

The next regular meeting of the association will be held February 5, when it is expected that many important matters will be taken up, including matters in connection with the holding of the May convention.

Pittsburg and Vicinity.

Annual Review of the Iron and Steel Market for 1695.

The market for iron and steel in the Pittsburg district during the past year has presented some remarkable phases, and in some cases the changes in prices and rapid advances in value went beyond everything recorded. The iron trade in 1895 is likened unto a sandwich, the meat or best part of it was in the middle. The year opened badly, the depression still having its hold on the trade, and business was continued as it had been for a year previous. It improved wonderfully and by the opening of June values began to grow stronger, and before the close of that month they were beginning to move along rapidly.

From that period until the close of October the iron and steel trade saw a period of activity that surprised many. During the early days of November prices began to recede, and kept creeping downward until the close of the year. No. 1 foundry iron remained without any change from the spring of the year until the middle of May. The first week of January No. 1 grade sold at $11 per ton, and No. 2 at $10.50. During May a slight advance was noted, the price being quoted about $11.25 for No. 1 and $10.75 for No. 2 grade. Higher prices were reached

early in September when No. 1 sold at $13.75 to $14, and No. 2 at $13.50 to $13.75. Very little was done in the months of November and December. Small sales were made at figures hard to obtain.

No. 2 grade is used mostly by Pittsburg consumers, and is generally sold at about the same price as gray forge. The range of prices is shown in the difference of $11 at the beginning of the year, and $14@14.25 during November and October. Below will be found the average monthly prices for the entire year:

	No. 1 Foundry.	No. 2 Foundry.
January.	$11.00@11.25	$10.00@10.25
February	11.00@11.25	9.75@10.00
March..	11.00@11.25	9.75@10.00
April	11.00@11.25	9.75@10.00
May....	11.00@11.25	9.85@10.15
June....	11.50@11.75	10.15@10.30
July....	11.75@12.00	10.75@11.00
August	12.50@12.75	11.25@11.50
September	13.50@14.00	13.00@13.25
October	13.75@14.00	13.00@13.25
November	14.00@14.25	13.25@13.50
December	13.50@13.75	12.60@12.85

COKE.

With the opening of the year the Connellsville coke trade was in a fair condition, and the production during some of the early months was quite large. During the month of March one of the largest monthly shipments was made. When the activity in the iron market showed itself, the coke trade shared in the general improvement. Through the months of June, July and August shipments increased at each report, but during September they fell off somewhat, but soon recovered in the following month, and the closing months showed the largest shipments of the year.

The two principal features of the market for the year were the three voluntary advances in wages by the H. C. Frick Coke Company, and then by other operators, and the absorption of the entire interests of the McClure Coke Company by the Frick Company.

The demand for coke during the entire year was heavy. The region was free from all labor difficulties, although the situation was threatening at times. At the time of the last advance made in the price of coke, the statement was given that contrary to past custom, it was the intention to live up to the official prices, instead of having an official price and an actual or lower price as heretofore. Whether $2 can be obtained for furnace coke in the present depressed condition of the iron market remains to be seen. Following will be found the monthly shipments of coke (in tons) and their prices:

	Ship'ts.	Fur.	Fdry.	Crush.
January	536,945	$1.00	$1.15	$1.40
February ...	578,102	1.00	1.15	1.40
March	809,898	1.00	1.15	1.40
April	538,310	1.35	1.50	1.65
May	609,332	1.35	1.50	1.65
June	575,441	1.35	1.50	1.65
July	598,793	1.35	1.50	1.65
August	753,646	1.35	1.50	1.65
September ..	641,155	1.35	1.50	1.65
October	676,547	1.60	2.00	2.25
November ...	863,484	1.60	2.00	2.25
December ...	704,798	1.60	2.00	2.25
Total	7,886,451			

The circular prices for the different grades beginning January 1, 189, are as follows: Furnace coke, $2.00; foundry, $2.30; crushed, $2.30. It is stated that some contracts have already been made below the advance prices.

ROLLING MILL CASTINGS.

There was but little change during the entire year for castings, the demand being somewhat light during the fore part, but increasing slightly toward July and August, when it again improved. Prices were of a stationary condition, the average price being about as follows:

	per lb.
Chilled rolls up to 12 in. diameter.....	3¾c
Chilled rolls over 12 in. diameter.....	3¼c
Sand and homogeneous steel rolls and pinions up to 12 in. diameter.....	2¾c
Over 12 in. diameter.....	2¼c
U-tooth pinions, additional.....	¼c
Housen and rolling mill castings not otherwise specified	2c
Spindles and coupling boxes.....	1¾c
Squeezer castings	2c
Squeezer pinions and rolls.....	2½c
Spur and bevel wheels, large.....	4c
Spur and bevel wheels, small.....3 to	4¼c

INDUSTRIAL NEWS.

The Pittsburg Malleable Iron Works will remove from its present location in Lawrenceville to East Pittsburg next summer, and an important enlargement of the plant made at the same time. The plans for the new plant have been prepared and the contract for erecting the buildings has been let.

The American Steel Casting Company, of

Sharon will enlarge the capacity of its plant. A new building is being erected immediately south of the steel casting plant. The additional buildings will be even larger than the plant now in operation. The structure will be pushed with all possible haste and by April 1 the plant is expected to be ready for work.

The new works of the Homestead Manufacturing Company have been started up. The plant consists of a foundry and machine shop with all the latest improved machinery and will turn out the patent "Straitway" valve, for which it has orders enough to keep it busy for six months. W. F. Harrison is superintendent of the works.

The Taylor-Wilson Manufacturing Company, Allegheny, has just put in a new 10-foot boring mill, a six-ton jib crane and other improved machinery. The company has an order from the Westinghouse Electric and Manufacturing Company for 12 large top and bottom dynamo fields, each seven tons, and a pair of socket tapping and spindle machines to go to France and which were ordered by the Oil Well Supply Company. The company is also building two machines for molding large gear wheels and has orders from Laughlin & Co., Harbison & Walker and Riter & Conley for special castings for machinery.

The Falcon Bronze Company, Youngstown, has its new plant ready for occupancy and has booked a number of large orders, among which are those from the Canton (O.) Rolling Mill Company for three tons of mill brasses and seven tons of engine brasses for Wm. Tod & Co., Youngstown.

Further improvements are contemplated by Jones & Laughlins to their plant on the South Side, which will greatly increase the production in several departments. In the converting department it is expected that the capacity of the Bessemer vessels will be increased from eight to ten tons, while contracts have been let for a new blooming mill. The firm will also make its own ingot molds, and a building for this purpose will be erected. An additional open-hearth plant is now being constructed.

The Pultney Foundry and Engineering Works, Youngstown, is being improved by the addition of a 72-inch lathe, 20-foot boring and turning mill, six-foot planer, which is 16 feet long, and a 40-inch lathe 36 feet long. A new pattern room 24x60, two stories high, has just been completed.

"Chimmy" Powers in St. Louis.

"What's new aroun' town? Nuttun much stirring," said "Chimmy," as he caught his breath after drinking a life size. Then turning his back to the bar, after giving Fred Pettker the finger, he lit a cigar and after a few meditative puffs proceeded to draw himself out: "Green's is one of de very few foundries aroun' town dats doin' anyt'ing, an' dey is right busy. The Phoenix laid off thirty molders, but put mos' of demon agin, an' among dem was t'ree ex-foremen,—Pat Leonard, John Cochran and 'Jack' Cunningham. 'Jack' never did go back 'til dey sent fer him, but de oder two jus' kep' hangin' aroun' until Gilson got tired of dere song an' put dem to work to get shut of dem. Dat's a mos' remarkable shop to work in anyway, any man wots workin' dere never knows w'at his getten' until Saturday night, it all depends on how much you do an' how good you do it, none of dem gets de same amount twice in succession. Deres a curious gang in dat shop, sure; dere use' to be two nigger molders workin' dere, both of dem served der time in the shop, an' my 'sperience while workin' dere wus dat dey wus de two whites' men in dere, both of dem is dead now an' dats the fix de Phoenix is left in.

"Allen's isn't doin' a ting. Sometimes dey makes two days a week, an' more times not so much, but it's a curious fac dat the mos' of ther molders in dat shop is rich, an' dey can afford to loaf; Luke Lamb and John McCarthy is kep' busy collectin' rents from der real 'state interests, while Fitz an' Alex Silvers, dey say, has a string of horses. Julius Smith is foreman dere yet, an' say, he's jus' all right.

"The Standard did you say? I dunno' wats goin' on aroun' dere, deys all Scandinavians workin' fur old Alex, wid the double hump on his back, mos' of dem live in the Ashley building. 'Chimmie' Reilly is the onliest Irish man dat worked dere in a long time. 'Big Finger' Connors worked dere too, an' he use' to tell about dem sendin' out fur a poun' of flour and a nickle's worth of nails, when dey had to have dat kind of luxuries. 'Kid' Kilpatrick, de ole man's son, is de

general manager of de hull foundry, an' a daisy he is too. I was up to Rankin an' Fritch's de odder day an' t'ings is lookin' a little better. Walker tole me dey had a forty ton ice machine to build, an' if I didn't find nuttin' in a day or two to kum aroun'. Den I went out to Dutroe's an' struck Harry Graf. Der auful busy up dere, but Harry said dey wus full handed an' tole me to call ag'in. I worked fur him in East St. Louis onct, an' a good place it wus to, but I couldn't stan' prosperity. I wus boardin' on 'Whiskey-Chute' in de 'Mad House' an' de beveredge use' to cum so reg'lar dat I wus no good de nex' day, an' had to hav' a 'hair of de dog' before I could do anyt'ing. I use' to make a sneak eve'y mornin' 'bout ten o'clock 'til Harry caught me in de ac', an' den he put a can on me.

"I hear Lew Brown's got charge of dat little 'Jim Crow' shop down on Lafayette street, where dey make nuttin' but sash weights; him an' anoder fellar, wi't 'Crazy' Ward, de core maker, tendin' cupola an' makin' flasks. An' say! I met 'Billy' Woodruff de odder mornin', sed he was workin' over in Tod's, where dey is putty busy; he'd bin workin' out at de Oak Hill, but wus gittin' slack dere. Did you ever see dat horse an' buggy Woodruff's got. No? Well, he'?s got one an' uses it 'stid of a bike. I dropped in de Pipe shop de odder day an' saw 'Big' Ed Colson an' Guenther, an' dey sed t'ings wus jus' middlin', so I struck ole Lew Doyle fur a job, an' what d'ye t'ink he sed to me? Nuttin': he jus' looked at me an' walked away. I met Joe Carlin de odder day an' he wanted to sell me a ticket fur de core makers' ball. Say, dis is de onliest event of de season an' you want to be in shape to pound san' on dat 'casion, sure. Joe sed Tommy had a 'flat wheel' yet, but will be in shape fur December 31st, de date of de ball.

"Timmerman's? Yes, I was down dere de day before yisti'day an' dey ain't doin' much, workin' short time an' short handed; same ole faces there yet—Hicock, Dillon, Wright, Powers an' de two Kodats. Dan Dougherty, de orator, is anoder inmate of dat institution again, so I see. No, I ain't seen Frank Sullivan fur some time, but I do know dat he's in business fur hisself. Ever hear how he got into business. He run fur Congress agin John O'Neal, on de labor ticket, sum years ago and wus defeated and went to work in Allen's agin, but shortly after dat he got it in de neck frum Fisher, de sup'intendent, den Frank got a job watchin' de gas lights fur de city. His distric' wus frum de Water Tower to Carondelet, an' frum de river to Forest Park; den he engaged wit' de McKelvy Ashfelt comp'ny as sup'intendent, an' de nex' t'ing I hearn wus dat Frank wus a partner in de biz wit' a pocket full of rocks. He's in de same biznes now fur hisself. Fisher met him one day an' begin to 'pologise fur havin' fired him, but Frank seys, never you mind, you done me de greates' favor in mi life, you druv me into mi fortune.

"Ole Pat Egan stopped me on de street de odder day; an' say, I hardly knowed him wit' de big long whiskers, an' he had on a new pair of shoes w'at hurt his feet. He sed he wus workin' at Todd an' Stanley's fur 'Billy' Mayhew. I sed, 'I tort you wus over on de odder side, Pat?' 'So I was,' sez he, but I got de "buttermilk chills" over dere, an' had to quit fur de good of me helt'.' A curious t'ing about Pat while he wus over at de foundry wus, dat you couldn't hardly tell him from de big German, Westermanstern, dats how Pat cum to let dem grow, so dat you could 'dentify him. Dey's so long now dat he mus' tie dem in a knot w'en he works at de bench. Come on an' lets have anoder an' den I'm goin' home. Gimme a beer, what'll you have?"

We think it a very practical and useful source of information.

UNION IRON WORKS,
Lynn, Mass.

W. A. Jones, of the W. A. Jones Foundry & Machine Co., 57 and 59 South Jefferson street, Chicago, report that their trade in "Power Transmission" has increased to such an extent that they have been compelled to add to their already large plant an additional floor space of 26x75 feet. This they have equipped with machine tools of the latest design and pattern for their particular line, and are prepared to furnish estimates on anything that may be required in all the various forms of "Power Transmission." They have recently got out a new and very nicely illustrated catalogue which they will be pleased to furnish on application.

James Chalmers.

The History of a Tramp Molder.

W. EDWARD.

CHAPTER XXIV.

Along in the afternoon I felt a train bump up against the car I was in, and heard the brakemen running over the top of the train, and presently the train pulled out. I was all stiff and cramped from being cooped up in my close quarters so long, and as soon as it was dark enough for me to venture out without being seen I opened the door and crawled out on the roof of the car, where I spent the most of the night. When daylight came I crawled back into my box and went to sleep. When we reached Nashville the car I was in was switched off again, but in a few minutes it was picked up by another train, and we pulled out for Chattanooga. It was late in the evening when we rounded Lookout Mountain and came in view of the city, and I made preparations to leave my sung berth.

As we pulled into the yards I saw a man watching me and caught the gleam of a star on his vest, and I suspected that he was a railroad detective on the lookout for tramps. He run over to the car I was on and commenced to climb up, but I was just as smart as he was and I run back about three or four car lengths, swung over the side and dropped to the ground. He yelled to me to stop and pulled his gun, but I crawled under a car and was soon out of sight. As soon as I was on the other side of the train I ran as fast as I could in the direction the train was going, supposing he would expect me to go in the other direction. I was right in this, for in about five minutes I looked back and saw him crawl out from under a car and look up and down the track, about three hundred yards from where I stood. I yelled at him and waved my hat; then I got out of the yard and tramped into the city.

I felt fresh as a daisy after my long ride, having done little else but sleep for three days and two nights, but I was hungry enough to eat an ox; so I steered into the first restaurant I came to and ate a hearty supper. Then I lit a cigar and sauntered around the city to see what changes had been made since I was there two years before.

I had intended going on to Birmingham that night, as it was still too chilly and disagreeable in Chattanooga to suit me, but in walking down one of the streets, who should I meet but "Billy" Patton, a molder I had worked with in Memphis.

"Where the devil did you come from," said Billy; "I thought you was up among the 'snow diggers.'"

"I was," said I, "until three days ago. Just come from Cleveland."

"Must be flush," said he, "if you can afford to travel first-class."

"Not much," said I. Then I told of how I had worked my way down from Cleveland and was going on to New Orleans, and maybe to Galveston.

"Don't do it," said he; "come on up to South Pittsburg with me, and go to work in the pipe shop; Warnock told me to-day that he wanted another man." Well, I wasn't hard to persuade, for, from the stories "Billy" told me, I was afraid the police might catch me in some of these southern towns and put me on the chain gang for thirty days, which is the way they have of restraining the "hobos" down there; so I concluded to go up to South Pittsburg with "Billy," who was married and had a family up there. We went to the theater and put in a pleasant evening, then we took the late train for South Pittsburg, arriving there about one o'clock in the morning.

On leaving Cleveland I had shipped my grip by express to Cincinnati, knowing that I could have it forwarded to me in any part of the country, and I would have no bother with it except to pay express charges; so the next morning, after "Jock" Warnock give me a job, I had the express agent telegraph for my grip and I hung around for a couple of days waiting for it to arrive.

This was my first job in a pipe shop and I don't want any more, at least not in a shop where you have to depend on the pipe cupolas for iron. The cupolas run from six o'clock in the morning until three or four in the afternoon, and we were just as liable to cast at seven or eight o'clock in the morning, or at noon, as we were at the regular casting time, and more than once I had to go to the hotel and eat a cold scrap dinner, because Warnock insisted on pouring off at noon. Aside from this the job was good enough, and I soon got the hang of making the pipe fittings, and would probably have

remained there if Warnock had let me alone. He was one of these hypercritical Scotchmen who imagine that nothing is done right unless they do it themselves, and that a man was no good unless he had served his time in "Glesca." He hadn't been in the country very long and I heard afterward that he had been drummed out of New Orleans for scabbing. At any rate, we didn't get along well together and, being a Scotchman myself, I took a delight in ridiculing the pretensions of old country workmen to superior skill, citing instances of several of the notoriously worthless Scotchmen whom I had met, two of whom had worked there. This was getting "next to his hide" and I knew he had no love for me, but he was all the time nagging me and criticising my work, although I did as much as the rest, and this was the only way I could get back at him. If I had known then what I learned afterward I would have roasted him worse than I did.

I worked along for nearly a month and toward the last I knew that Warnock was watching me closely to give me the run, and give it to me good and hard, but I was careful not to give him the opportunity if I could avoid it. One day I was making some big reducers and in some way the core floated and cut through. I knew this would be a chance for him when he saw it, but it would likely be several days before it was cleaned and in the meantime I intended to quit. The day following was pay day, so I told Warnock that I intended to quit that night and would like to have all that was coming to me the next day. He didn't say a word about my going, but "Billy" and the other fellows tried to persuade me to stay. I thought it was better to quit than to be fired, however, and I knew if I stayed on it would only be a question of time and opportunity.

Up to the moment I quit I had no clearly defined idea where I should strike for next, my main idea being to get away from the pipe shop; where I should go or what I would do when I left South Pittsburg was an after consideration which did not worry me very much. It was Friday night when I quit work, but I had to wait until the next afternoon to get my money, and, as I did not care to start on the road on Sunday and there was no amusement of any kind in South Pittsburg, I concluded to run down to Chattanooga and have a little sport for a couple of days, when I would make up my mind where to strike for next. I struck "Big Jim" Allen and Tim Dolan at a popular "hang out" of the boys in Chattanooga, and we painted the town together. "Big Jim" got so boisterous towards morning that we all came near being run in for creating a disturbance on the streets, and at the first opportunity I made a sneak and managed to get to my room at the hotel, but I was carrying too much of a load to undress myself, so I went to bed with my clothes on and slept until nearly noon.

The big strike was still on in Anniston and the shop was being run by a lot of scabs from St. Louis and Kansas City, who had flocked there like a lot of buzzards as soon as the trouble commenced. The boys told me that Birmingham and Decatur, as well as Chattanooga, were overrun with men who had left Anniston, so I knew there was not much show for a job in either of these places, and, as it was about time for the rush to commence in New Orleans, I concluded to go down there and not waste any time on the road. The next morning I skirmished around among the scalpers' offices to see what I could get a ticket to New Orleans for, and I struck one for $6, so I decided it was cheaper to ride first-class than to beat my way at this price.

When I reached New Orleans I skirmished around several of the shops to see if I could find any of the boys I knew before I looked for a job, and at Leeds' I run across Barney McClain and Tom Vaughan, both of whom I had met before. The boys told me that work was dull all over the city, but as I was there I might as well take in the shops and see what was going on. It was early in the so I commenced by striking the foreman at morning and I had the whole day before me, Leeds' for a job. After hunting around the shop for some time I found him sitting down beside a cupboard with his hat pulled down over his eyes and apparently half asleep. He looked as if he had been out with the boys the night before and hadn't had an eye opener yet. As I walked up to him he raised his head and asked me what in — I wanted. I told him I was a molder and was looking for a job, when, with a jerk, he pulled his hat down over his eyes again and told me to get

out and not bother him about work. I went over to Reynolds' and then to Whitney's, Shakespeare's and three or four of the other shops, but with no better success, everything was dull and there was no work doing so I concluded to give it up and strike for some other town.

I had intended to go out into Texas again, but as things turned out I went in the opposite direction. I had made an engagement to meet Barney and Tom Vaughan that night, who said they would take me out and show me the town. I felt rather blue at not striking a job, as New Orleans is a great town for sport and I had made up my mind that if I could strike anything I would hold on to it for the summer. After I met the boys I soon forgot my disappointment and inside of an hour I was ready for anything that turned up. As soon as we began to "feel our oats" we started for the French quarter, and on the way we dropped into a gambling saloon, where I was lucky enough to pick up fifteen "cases" on a chuck-a-luck game. When my luck began to turn I tried faro, but I had no luck either at faro or on the roulette table. I remember going into two or three places after we left that gambling room, but after that where we went to or what happened I have no recollection, everything I remembered was a man trying to waken me by kicking my ribs. When I gathered my scattered senses together I found that I was lying on the floor of a box car, with a brakeman standing over me and the train pulling out pretty lively. I staggered to my feet and asked him where I was and how I got there. He told me that I was on the L. & N. road and we were half way to Mobile. How I came to be in the car he didn't know, but when he saw me lying there so still he thought I was dead and he had climbed in the end door to investigate. My tongue was so thick that I could hardly speak, and my head felt as if it would burst so I lay down again on the floor of the car and closed my eyes, not caring whether I was put off the train or not. Just then the engineer whistled for brakes, and, after telling me to get off as soon as the train stopped, the brakeman climbed out on the roof of the car again.

When the train came to a standstill at a lonely looking station without a house in sight the "brakie" and the conductor came back to the car where I was lying and hustled me out. The jar of the train made my head ache worse and I felt sick all over, so I made no objection to getting off the train. All I wanted was to be let alone. The weather was warm and pleasant and I discovered a cottonseed shed a short distance down the track, into which I crawled, and was soon sound asleep. I woke up toward midnight, my headache was gone and I felt much better, although my throat was dry and parched and I was as hungry as a hawk. I lay for a long while listening to the roll of the waves on the beach, which was scarcely a mile away, but finding that I could not get to sleep again I crawled out of the shed to take a look at my surroundings. It was a beautiful, clear starlight night, such as one sees only under a southern sky, and the gentle breeze from off the Gulf was cool and refreshing. I was terribly thirsty but I knew better than to drink any of the brackish swamp water, which lay in pools along the railroad. Getting my bearings by the moon, which was just going down, I turned my face to the east and started to walk down the railroad in the hope of finding a spring or a stream running into the Gulf, where I could quench my thirst, and to find a place where I could get something to eat when morning came.

I must have walked ten or twelve miles without seeing a house of any kind, but I managed to get a drink from a little stream which run under the railroad before I had gone very far, when, just about daybreak, I came to a station on the road which boasted of two stores and six or eight fishermen's cottages. I sat down on the platform of the station to wait until the people began to stir around. It was not long before smoke began to rise from the chimneys of several of the houses and I set out to hunt a breakfast. I wasn't broke by any means, having had about twenty dollars when I landed in New Orleans and making more than I had spent there on the chuck-a-luck game, I thought I was pretty well heeled with twenty-six "plunks" in my pocket. I knew there was no use to look for an eye-opener, although one would have been very acceptable, because Mississippi is a prohibition state, where they arrest a man for giving another a drink of liquor. The first house I went to, an old fat colored aunty came to the door and I asked

her how long it would take her to get me up a good breakfast. The old woman rolled her eyes up at me and said: "Lo'd bress you, chile, I ain't got nothing to give to por white folks," but when I showed her two bits she hustled around in a hurry and got me up a breakfast of corn pone, bacon and black coffee, to which I did ample justice.

I lay around the town for a whole day gossiping with the fishermen and enjoying myself and in the afternoon I took a walk down the beach out of sight of the nearest cottage and took a bath in the surf. The water was cold but the air was warm and pleasant and I enjoyed my bath hugely. I enjoyed the novelty of the situation so much that I thought of trying to get work with the fishermen and staying there for a month or two, but that was only a notion and the next afternoon found me anxiously watching for the freight for Mobile which passed through about 4 o'clock in the afternoon. There was a water tank near the station and when I heard the whistle of the train I hid myself in a clump of cane on the opposite side from the station and watched for an empty box car. The trainmen all got off on the other side of the train and, seeing a car with the door open, I walked down through the cane until opposite the car when I climbed in and shut the door all but a few inches, so that I could see out without being seen.

(To be Continued.)

Questions and Answers.

"G. V."—Can tin scrap from a tin stamping mill be profitably melted in an ordinary cupola for sash weight castings; and about what fuel and wind required. Are the sash-weights cast from tin?

H. H. M. says: "I have quite an accumulation of wrought iron scrap, for which I have no use and cannot sell. Can I melt it by mixing with iron in any proportion. My cupola is 26 inches in diameter, and I have thought I could make it into sashweights. How shall I proceed to melt the turnings and borings from my engine lathes? Should I use fluorspar, and is the lump or ground article the best? How many pounds of good charcoal does it take to equal 100 pounds of coke, and what would make the best charcoal?

L. L. ASKS.

We wish some information concerning an article called spelter. It is used extensively by coppersmiths to unite brass or copper to iron. It is composed of fine yellow brass and zinc and poured into a tub of water, the latter being set in motion by means of a coarse sieve attached to a center pin, which is rapidly turned around. What I would like to know is the proportions of zinc to the yellow brass; if it has to be melted very hot, and at what time the zinc must be put in? Any information concerning this matter will be thankfully received. L. L.

W. B. & M. Co. write: We are endeavoring to reach the best possible means and at the same time the most economical manner and mode of re-melting old metal such as copper boiler bottoms, light scrap, and in fact heterogenous masses of old metals such as you would buy from a junk dealer. We have at present furnaces for thirty-five pound and one hundred pound crucibles, but we did not know but possibly you might be able to give us some plan which would be better, as we find at times it is a hard matter to get some of this old stuff into the crucibles without its melting and running into the fire unless considerable time is taken and same is cut up or pounded.

W. J. C. desires to know whether brass can be successfully melted or not in a cupola; what the cupola should be lined with; how it is affected by being tapped into a ladle and how the cupola should be charged, etc.

Notice.

Advertisements Entitled Situations Wanted, or Situations Vacant Will be Inserted in this column one insertion FREE. All others 25 cents per line.

WANTED—Machinery for grinding and bolting foundry facing. E. A. KEBLER, s. e. s. Third and Walnut sts., Cincinnati, O.

WANTED—Foundry superintendent, one who has had experience in plumbing supplies preferred. Address stating references and experience B. Y., care of The Foundry.

WANTED—Position as foreman, 20 years' experience on light or heavy castings or

stove plate; best of references. Address M., care of The Foundry.

WANTED—Situation as foundry foreman; has had 30 years' experience in the practical knowledge of loam, dry and green sand; marine work preferred; good references given. Address 25 Birch st., Cleveland, O.

WANTED—Experienced melter well posted in mixing iron, running and slagging a large cupola; give references. Address "Permanent Position," care The Foundry Publishing Co., Detroit, Mich.

WANTED—Thoroughly competent superintendent for malleable iron foundry; must be up to date in all particulars, understand iron mixtures and all the latest improvements for the economical production of work. Address J. H., care of The Foundry.

WANTED—A man 33 years of age, capable of taking charge of foundry would like to correspond with any firm contemplating making a change in the foreman; best of references. Address F. B., care of The Foundry.

WANTED—First-class man to take charge of a new modern foundry just starting in the city of Monterey, Mex.; must understand the business thoroughly, capable of handling men, well up in cupola practice and have some ability to surmount difficulties if necessary; to a good man a liberal salary will be paid. Address G. F. M., care of The Foundry.

IMPORTANT—Steel casting and engineering firm having about 200 tons weekly capacity requires a general manager; must have knowledge of this special business as well as general mechanical and metallurgical ability; also well acquainted with general commercial routine, reliable casting system and able to control workmen; preference given to one who could extend and introduce business; a very liberal salary and share of profits would be offered to one of special ability. Inquirers are in good financial condition and able to find capital for developments; applications will be treated in strict confidence. Address STEEL FOUNDRY, care The Foundry.

WANTED—To correspond with one who is competent to operate a foundry employing from 6 to 14 molders and doing a general machinery and also architectural iron business; must be a person of first-class executive ability and knowledge of what constitutes a fair day's work; also competent to maintain a foundry cost account; with a satisfactory person arrangements might be made to operate a first-class foundry either by the ton or as foreman; foundry located in Indiana. Address CHARLES EWING, JR., Anderson, Ind.

Study of Foundry Characters.

The Mischievous Boy.

When our wife with her customary impudence was following her usual course of going through our pockets in search of stray nickels, with which we were suspected of lingering around the "Green Tree" until our thirst was vanquished, she ran against the lifeless body of a full grown rat, and instantly accused us of intending to furnish her with a fatal shock. We offered in evidence against this our spotless pedigree, backed up with a very strong assertion that we did not voluntarily act as pallbearer to a deceased rodent. The day before the rat caused domestic clouds to hover about us we had lugged a considerable amount of sand home in our dinner bucket, and we felt that the way things were going and the way w were being treated was an imposition on our dignity.

We have always said that there was no one who could enjoy a joke better than ourselves, but when we expressed ourselves thus, we forgot to add, tnat we were of that opinion only so long as the joke was played on our neighbors. When we were working in Look Sober & Co.'s foundry we undertook to relieve the pressure on our humorous safety valve by placing a large worn out chew of tobacco on the handle of the cupol tender's shovel. When we failed to disguise our pleasure over his discomfiture, this individual threatened to perforate us with the tapping bar. We appealed for protection to the foreman, who said we ought to be keel hauled for daring to violate the rules of the shop prohibiting the playing of pranks. We had almost forgotten to mention that in our parting salute to this place we mentioned it as our opinion that foundries with such a Presbyterian strictness encircling them were not a safe place for anyone except consump-

tives and others who expected death to relieve them at any moment. We have noticed since then that in shops where the promulgation of something to laugh at is not prohibited, men will do more work, be willing to give each other a hand. We have also noticed that in foundries where nobody can smile without permission, where red tape is used and orders must travel the official routine, where no man feels obliged to act except under orders that it sometimes costs fifty cents to get a quarter's worth of work done. We have noticed that where men have some sort of a social intercourse between each other they regard themselves as members of the company and feel part of its responsibilities.

But we started out with the intention of confining ourselves to the mischievous boy and the influence he exerts on those with whom he comes in contact; we will try to discuss his virtues as if he had never caused us to forget that we were a church member. When he drove a nail through the bottom of Jack's blacking bucket into a plank, and Jack came along mad, gave the bucket a yank and upset the nasty stuff on himself, did we think it was wrong to spoil Jack's clothes? Not much; everybody except Jack seemed to enjoy the successful termination of the prank; we went over to the carpenter shop and rolled on the floor till exhausted and then went back and worked like Sampson to make up for it. When somebody filled Bill Nye's shoes half full of paste, and this gentleman came along and inserted his lower extremities into what was supposed to be empty space, did we try to ferret out the perpetrator of this foul deed? Did we even express our sympathy? No, we did not. We have always considered something to laugh at as one of the greatest stimulants that could be offered us; it has helped us mentally and physically. But just now, when we have been compelled to hold the bottle and let the other fellows have the contents, when we are the victim that furnishes something to laugh about, it is rather against our will that we acknowledge a joke to be good medicine for tired feelings and an aching head.

We say the mischievous boy is a nuisance when part of his mischief-making proclivities affect us disagreeably. We slap him on the back and call him a royal good fellow when he confines his attentions to others. Therefore, whether we like him or despise him depends on how close he steps to our sore spots.

When we lost our day's work the other night, and the old man jacked us up till we were ready to swear that life was not worth living, that mischievous Alick fastened a bunch of shavings to Robinson and set them afire. When it became evident to Mr. Robinson that something was becoming hot in his rear, he became excited, and Alick, seeming a sort of excited, too, fired half a bucket of claywash on him to extinguish the conflagration. The old man came over and talked to us as if he had not fifteen minutes before knocked our feelings into a cataleptic state. The old man is something like ourselves, enjoys a joke hugely as long as you keep your hands off him. He said it was a kind of tough on Robinson, but that he had no business to sit down and go to sleep anyhow, when he knew he was wanted to help do the churning. It was not exactly what the old man said that caused our nerves to limber up and a smile to overspread our features. The mere fact that he talked to us was sufficient for us to know that he had forgiven us for our bad work and intended to give us another show. What brought this happy change about, what shifteed our feelings from despair to joviality, what switched the old man into a happier mood? The mischievous boy. We confess that the general laugh and uproar he caused did more to buoy up our feelings than the six beers we made away with afterwards.

Mischief is not an indication of meanness. When we played out a week ago, who was it came over and got our ladle and poured off our floor, it was that mischievous boy. Who pulled out his last dime and handed it to a hungry hobo? The same fellow. He may be full of tricks, but is this not to be preferred to an empty head? He is as ready to give a lift, run an errand or do a dirty job we hate to get down to ourselves as he is to put a chalk mark on our back. It is unpleasant to be the victim of the mischievous boy, we can't laugh at ourselves, that is where the rule comes in, we are too human for that. But is an occasional hearty laugh not the best kind of a stimulant? Does it not make everybody, except one, feel better? Do we not all work the harder afterwards? I think you will say yes, everything seems brighter.

A certain percentage of something to laug at is as necessary to us as the sun is to growing plant.

Chicago Enterprise.

Capt. Duck keeps a foundry in Chicago, and some of the foundrymen who feel competition rather keenly from that source, may find herein one of the reasons why they are underbid. The following illustrates but one of the peculiar traits of Capt. Duck, but it is sufficient to show that he would stop for nothing, and of the resources which lay behind this man the reader can judge.

A molder as an introduction to Capt. Duck, a good many have got that far, was given boiler front to mold up. He went to work and did exceedingly well until preparatory to rolling the drag over he found himself minus a bottom board. Approaching Capt. Duck on this matter, he was politely informed that he would find one on the fence. The molder, concluding that a board would be found somewhere along the ten-foot fence, enclosing the foundry, made a close inspection and returned with the information that he could find nothing resembling a bottom board. "What did I tell you?" roared Capt. Duck. "That I would find one on the fence," retorted the molder. "Well, get it, then, durn you," blustered the doughty foundryman. "More lively and rip half a dozen of them off. I got to have four fronts to-day."

Such books are just what is wanted and we think well of it.

R. V. CAREY.
Supt. H. T. Merriam & Co.
Millbury, Mass.

I am well pleased with THE FOUNDRY and get much information from it.

R. N. WILSON,
Foreman H. N. Hubbard's Foundry,
Boonton, N. J.

We like it very much and wonder how we got along without it before it came.

NORWALK FOUNDRY & MFG. CO.,
Norfolk, Neb.

The editor of the Review of Reviews, in the January number of that international journal, ventures a brief forecast of the new year's developments in which he predicts the settlement of the Cuban, Turkish and Chinese problems of nationality and government, the rapid industrial advancement of Japan, the still greater progress of European enterprise in Africa, the unprecedented hastening of railway building in northern Asia, the laying of two Pacific cables, the practical use of horseless carriages in Europe, the replacing of steam by electricity on some important lines of railway, and valuable discoveries in medical and sanitary science. On the whole, the Review looks forward to a "hopeful and interesting new year."

Lots of good things in THE FOUNDRY. Gets better every month.

R. C. PAUL & SON,
Cumberland, Md.

We take much pleasure in subscribing for THE FOUNDRY for the coming year. It contains much valuable information.

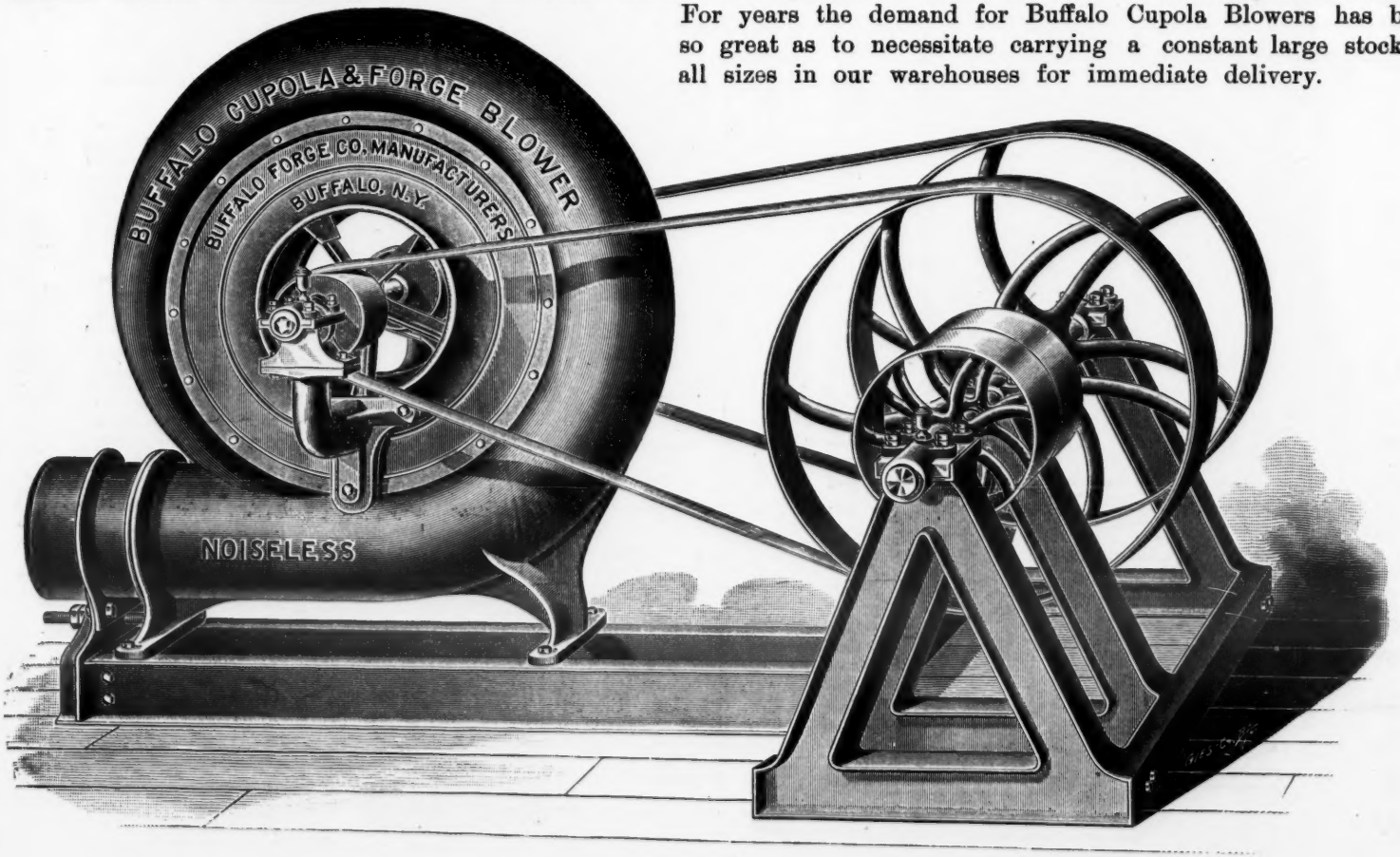
LIBERTY BRASS WORKS,
Baltimore, Md.

The Diamond Machine Co., of Providence, R. I., are said to be the largest manufacturers devoted exclusively of polishing and grinding machinery in this country.

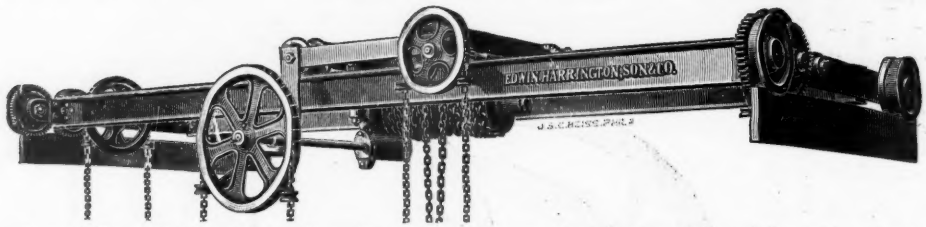
We are advised by M. Darragh & Co., of Fallston, Pa., that the item recently published in this and other trade journals concerning an antiquated cupola supposed to be operated by them was incorrect, as their equipment is said to be up-to-date in every particular.

The Latest Developments in Foundry Blower Construction is fully detailed in the 1896 catalogue of the Buffalo Forge Company, Buffalo, N. Y., U. S. A. You are, perhaps, remodeling or building a new plant. Much data of unusual interest is contained therein. Its value needs no emphasis to those who have reviewed previous issues.

For years the demand for Buffalo Cupola Blowers has been so great as to necessitate carrying a constant large stock of all sizes in our warehouses for immediate delivery.



SAFETY TRAVELING CRANE.



Especially well adapted for Foundry use or wherever careful handling of loads is required. Thus copes and moulds can be lifted and transported with absolute safety. There is no jumping of chains; no jarring of load; no loss of sand; no breaking down of mould.

Will Hold the Load at any Point.

The chains wind on a drum, having right and left spiral threads. The hand chain wheel is removed from the line of the load by means of extended shaft a fact which is of great advantage to the operator. The crane is supplied with roller bearings and travels with an easy steady movement. It is equally well adapted for heavy or light loads.

Let us give you an estimate. State required span and capacity.

LATHES, DRILLS, PLANERS, GEAR CUTTING,
DOUBLE CHAIN SCREW HOISTS.

Edwin Harrington, Son & Co.

INCORPORATED.

1521 Pennsylvania Ave. - PHILADELPHIA, PA

Rubber Tipped Foundry Rammers.

FOR FLOOR OR BENCH.

The Foundry Rammer, shown in the cut, has advantages over the rammer usually employed in foundries, in that it does not mar the pattern, whether it be of wood or metal, and with it the mould can be made as hard as with the ordinary rammers.

The Rubber Tip is held in an iron holder by two pins, and can be replaced by a new tip at a small expense and with little trouble when it becomes worn.

These Rammers are made in two sizes.

The Bench Rammer is provided with a handle made of $\frac{5}{8}$ in. round iron, screwed into the holder, the length over all being $35\frac{1}{4}$ inches.

Price: Rammer for floor, complete, 85 cts., Rubber Tips, 15 cts.

Rammers for bench, complete, 70 cts., Rubber Tips 12 cts. each.

Brown & Sharpe Mfg. Co.,

PROVIDENCE, R. I.

BUYERS' DIRECTORY.

ALUMINUM.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.

AIR HOISTS.
Whiting Foundry Equipment Co., Harvey, Ill.

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Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lansing Wheelbarrow Co., Lansing, Mich.

BLOWERS.
Buffalo Forge Co., Buffalo, N. Y.
Connersville Blower Co., Connersville, Ind.
Garden City Fan Co. Chicago, Ills.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass
Wilbraham Baker Blower Co., Philadelphia, Pa.

BRONZES.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

CHARCOAL.
Springfield Facing Co., Springfield, Mass.

COKE.
Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
Stewart, W. H., 182 Front St., New York.

CORE OVENS.
Millett Core Oven Co., Brightwood, Mass.

CORE OVEN CARS.
Lansing Wheelbarrow Co., Lansing, Mich.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Foundry Outfitting Co., Detroit Mich.
Whiting Foundry Equipment Co., Chicago.

CRANES.
Craig Ridgeway & Sons, Coatesville, Pa.
Harrington, E., Sons & Co., Philadelphia, Pa.
Phœnix Iron Works Co., Cleveland, Ohio.
Shaw Electric Crane Co.
Wm. Sellers Co.
Whiting Foundry Equipment Co., Harvey, Ill.

CRUCIBLES.
Joseph Dixon Crucible Co., Jersey City, N.J.
McCullough-Dalzell Co, Pittsburg, Pa.
Taylor Crucible Co., Robt. J., Philadelphia, Pa.

CUPOLAS.
Foundry Outfitting Co., The, Detroit, Mich.
Springfield Cupola Co., Springfield, O.
Whiting Foundry Equipment Co., Harvey, Ill.

FIRE-BRICK.
Brooklyn Fire Brick Works, Brooklyn, N. Y.
Garden City Sand Co., Chicago, Ill.
Obermayer Company, The S., Cincinnati, Ohio
Ohio Sand and Clay Company, Columbus, Ohio.
Paxson, J. W., & Co., Philadelphia, Pa.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.

FOUNDRY LADLES.
Foundry Outfitting Co., The, Detroit.
Obermayer Company, The S., Cincinnati, Ohio.
Paxson & Co., J. W., Philadelphia, Pa.
Phœnix Iron Works Co., Cleveland, Ohio.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co New York.
Whiting Foundry Equipment Co., Harvey, Ills

FOUNDRY PLANS.
Foundry Outfitting Co., The, Detroit, Mich.
Whiting Foundry Equipment Co., Harvey, Ills

FOUNDRY SUPPLIES.
Albany Facing Co., Albany, N. Y.
Springfield Facing Co., Springfield, Mass.
Foundry Outfitting Co., The, Detroit, Mich.
Joseph Dixon Crucible Co. Jersey City, N J.
Garden City Sand Co., Chicago, Ill.
Obermayer Company, The S., Cincinnati, Ohio
Paxson & Co., J. W., Philadelphia, Pa.
Smith Foundry Supply Co., Cincinnati, O.

IRON BUILDINGS.
Berlin Iron Bridge Company, East Berlin, Conn
Wrought Iron Bridge Company, Canton, Ohio.

IRON FILLER.
D. N. Clark & Co., Shelton, Conn.
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MANGANESE AND SILICON.
Cowles Electric Smelting and Aluminum Co., Lock port, N. Y.

MOLDING MACHINES.
Tabor Mfg. Company, 39 Cortlandt st., New York

MOLDING SAND.
Foundry Outfitting Co., The, Detroit.
Garden City Sand Co., Chicago, Ill.
Paxson & Co., J. W., Philadelphia, Pa.

OIL BURNERS.
Thurman Fuel Oil Burner Co., Indianapolis, Indiana,

PATTERN FILLETS.
Canton Fillet Co. Canton, Ohio.

PATTERM LETTERS.
Campbell, Twining, Paterson, N. J.

PATTERN MAKERS.
The Gobeille Pattern Co., Cleveland, Ohio.

PATTERN MAKERS SUPPLIES.
Frank H. Clement Co., Rochester, N. Y.
The J. A. Fay & Egan Co., Cincinnati, Ohio.
Milwaukee Foundry Supply Co., Milwaukee, Wis.

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ANYTHING, from a Toy Pistol to a Steel Plant.
Largest Pattern Works in the World.

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W. H. STEWART'S LIQUID Founders' Core Compound

Used by the Principal Foundries in the U. S.

Prepared ready for use in **LIQUID FORM** to be mixed with the regular core sand. The cores are **DAMP-PROOF** and do not absorb moisture. **SPUTTERING** and **BLOWING** by reason of damp cores are avoided. The cores are **HARDER, FIRMER** and **STRONGER** than can be made by any other process and cost less to make. They can be set at any time and **EASILY CLEANED FROM THE CASTING.** Send for our descriptive pamphlet with prices and directions for use.

W. H. STEWART,
SOLE MANUFACTURER,
182 FRONT ST. **NEW YORK.**

Cast Steel Cement.

DO not pay high prices for a material for filling blow holes and imperfections in castings.

Cast Steel Cement

is lowest in price and does the best work.

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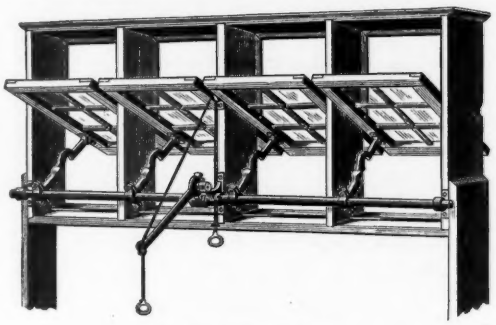
THE NATIONAL SELF-LOCKING VENTILATOR IRONS



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For Foundries, Annealing Shops, Blacksmith Shops, Dye Houses, Abattoirs, Medical Colleges, Weave Sheds, Green Houses, Rolling Mills, Glass Works and all places where Ventilators are used.

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"Columbus" Steel Tubular Wheelbarrow.

Made throughout of the best quality of high grade steel. Tray stamped without joint, seam or rivet, with edge bound over steel rod. Handles, Legs and Wheels the strongest put upon Tubular Barrows.

Made in nine different sizes. Largest manufacturers in the United States of TUBULAR BARROWS, STEEL CHARGING BARROWS and WOODEN BARROWS of every variety. Write for catalogue to

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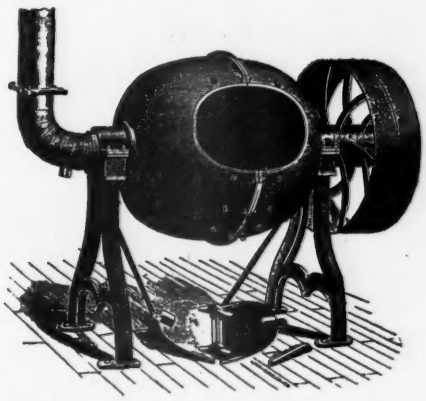
EXHAUST TUMBLING BARREL



The Stover Egg Shaped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

For full particulars, address,

Stover Manufacturing Co.

205 RIVER STREET,

FREEPORT, ILL

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.50 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month, $20.00
Half page - - -	" 12.00
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When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates, thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements should be in by the 25th of the month preceding publication.

DO YOU MAKE YOURS?

? ? ? ? ? ?

HENRY HANSEN

In his paper read before the September meeting of the Western Foundrymen's Association said: "The ordinary chaplets for which almost every foundry used to rely on the blacksmith nearest at hand, which has probably been the cause of more castings being discarded and patched up than any other thing of their size are now being made by special methods and presented in a far superior condition, besides being placed on the market at a price that would not keep a blacksmith in tobacco, at the same time there are many foundries that still insist on making their own inferior Chaplets."

JOHN PETTIGREW

Superintendent of the Illinois Steel Company's foundry, at Joliet, Ills. said at the same meeting on this subject: "It is only about six months ago that I first bought factory-made chaplets. We were making our own chaplets and lost a great many castings from their not being properly made. After we had bought the first lot for, I think, 60 cents a hundred, I commenced to figure up the list of those we had made and found it had been at least $2.50 and besides were not as good an article."

WE KEEP ALL KINDS IN STOCK.

Cleveland Chaplet & Mfg. Co.

CLEVELAND, OHIO.

Boutelle's Improved Snap Flask

FOR HEAVY WORK.

PATENTED JULY 17, 1894.

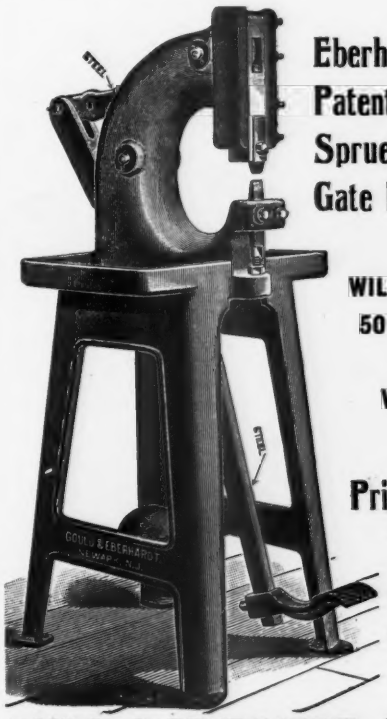
NO STRAINING OF WORK.

SAVES Floor Space SAND TIME MONEY

Send for Circulars and Price List.

R. W. BOUTELLE,

ORANGE, MASS.



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WILL STAND 50 YEARS OF WORK

Price Low

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Tubular Steel Tray Barrows.

STYLE A 2 TO A 8. Fig. 253.

PAINTED BLUE.

The trays of these barrows are made of one piece of steel, of the same thickness throughout The expense of repairing wooden barrows is greater than the original cost, and the loss of time so increases the expense that the steel barrow is cheaper in the end.

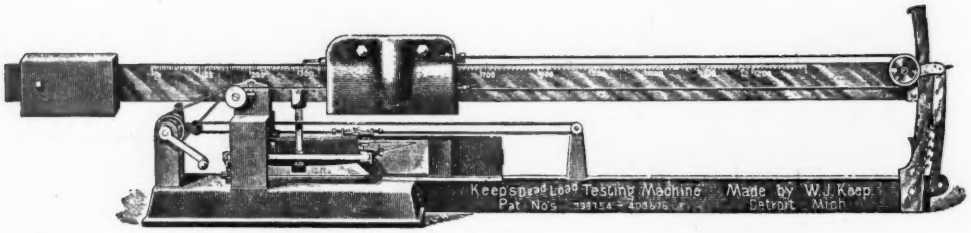
These barrows are made to dump forward, and are so constructed that at the dumping point they will not run back on the operator.

The wheels are made with gray iron hubs with round iron spokes shouldered at tire, passing through and riveted on outside. It is impossible for the spokes to become loosened from either tire or hub. Tires are 1¾ in. wide. Wheels revolve on ⅝ in. bolt through hub.

Write for circulars and prices. We make all styles of warehouse trucks and wood and steel barrows.

LANSING WHEELBARROW CO., LANSING, MICH.

"Keep's Test" Apparatus.



Keep's Testing Machine.

By its Use
You can Produce
The Best Quality
Of Cast Iron from
The Cheapest Pig Iron.

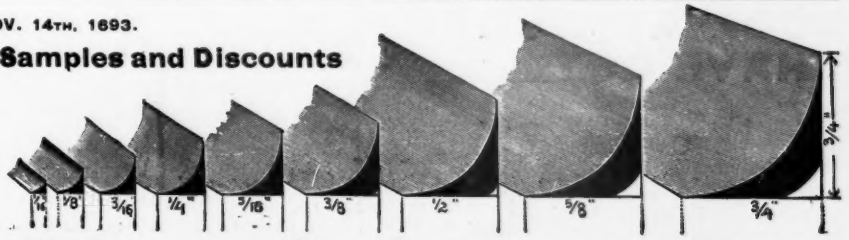
2 Sets Bronze Patterns with Followboard.
1 Pair Yokes for Shrinkage and Chill.
4 Iron Flasks.
1 Taper Steel Scale $\frac{50}{1000}$ to $\frac{250}{1000}$
1 Table for Measuring Shrinkage.

For Circulars and Price List, Address

W. J. KEEP, Detroit, Mich

PATENTED NOV. 14TH, 1693.

Write for Samples and Discounts



Pattern Makers and Founders Should use none but the **BELDING PATENT LEATHER FILLET**, the only one made scientifically correct. Quickly applied to any corner, straight surface, single or compound curves, wood or iron, without nails or clamps. Once used, always used. Send sample order. **Proper Discounts will be Allowed You.**

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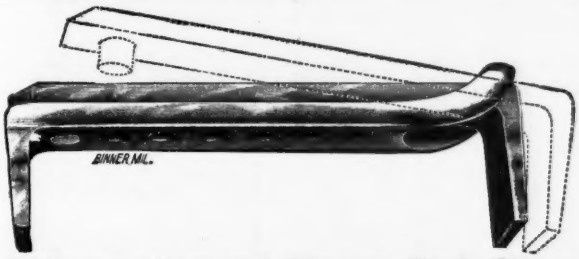

THIS is our ADJUSTABLE CLAMP. The Most Convenient thing possible in any foundry. We also manufacture a large line of Rapping Plates, Lifting Screws, Etc.

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A COMPLETE ILLUSTRATED EXPOSITION OF

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COMPRISING THE

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Practical Molder and Manager of Foundries; Author of "The Iron Founder," etc.

400 Pages. Fully Illustrated.

Price $2.50, Post-Paid; with THE FOUNDRY, one year $3.00.

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CHARCOAL

FOR FIRES.

CAR LOTS DELIVERED TO ALL PARTS OF THE U.S.

OUR CHARCOAL FACING FOR

BRASS FOUNDRIES

IS UNLIKE ANY OTHER.

IT WILL PAY YOU TO KNOW ABOUT IT.

SPRINGFIELD FACING CO.

SPRINGFIELD, MASS.

LOOK AT WHAT I HAVE GOT

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Brass Pattern Letters and Figures

With Spurs on the Back to hold them on.
They Never Drop off.

MADE IN 3 SIZES—½ in., ⅝ in., ¾ in.

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For small orders, and same discounts as Lead Letters in Quantities.

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ALUMINUM and BRASS FOUNDER,
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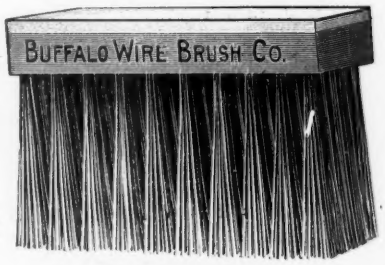

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Don't be FOOLED and think High Silicon Irons are a "cure all." Remember a "silk purse is not made out of a sow's ear."

The Best Material Only,
Complete Analysis and
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In the Largest Chemical and Physical Laboratory devoted to Foundry Iron in the United States is what makes . .

CLINTON INSPECTED FOUNDRY IRON

THE IRON IT IS

Clinton Iron & Steel Co.
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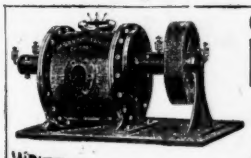

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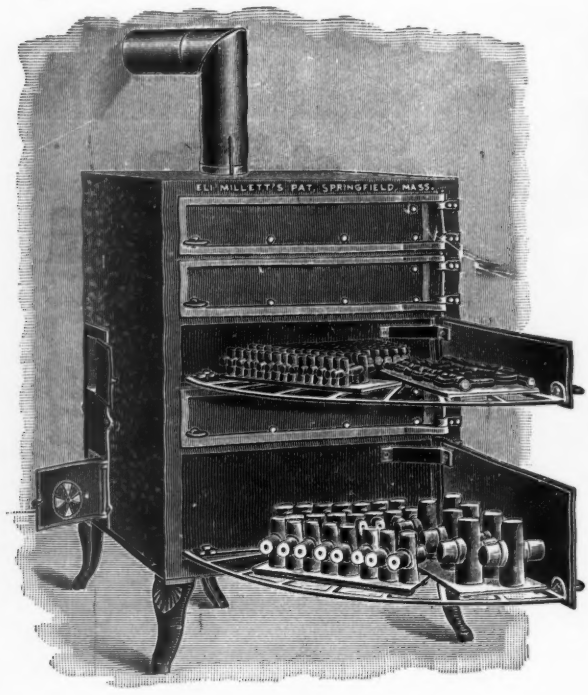

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No Foundry using small Cores can afford to be without it.

Over one hundred and fifty in use.

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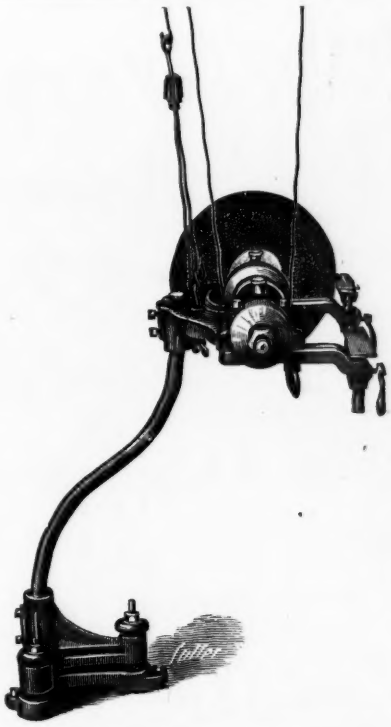

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THIS MACHINE is unsurpassed as a dry grinder. It is practically noiseless, does not jar the building, is light and springy to the touch, the emery wheels wear true down to the flanges; the work does not bump on the wheel, and can be cut down by it quicker than on any other style of grinder. We have testimonials from many manufacturers as to its good qualities, which we will send to anyone interested on receipt of their business card.

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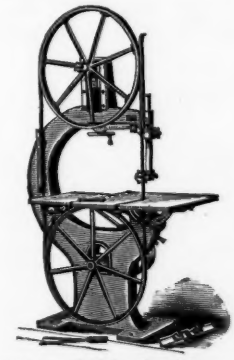

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Complete Outfits

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Strictly first-class Tools

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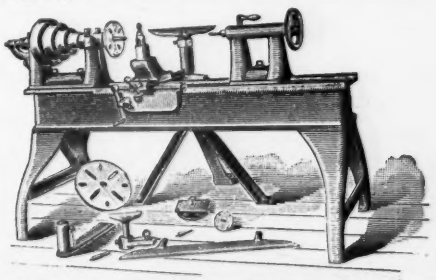

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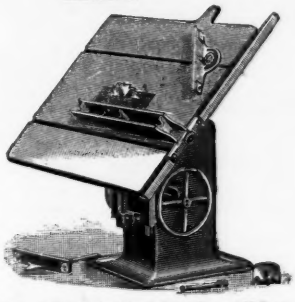

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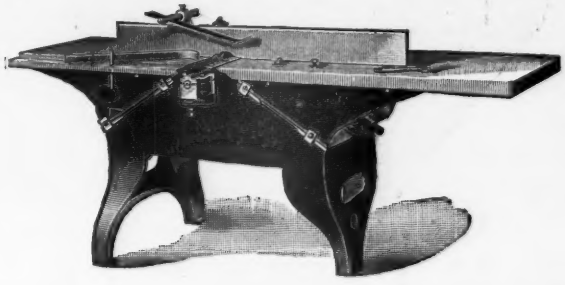

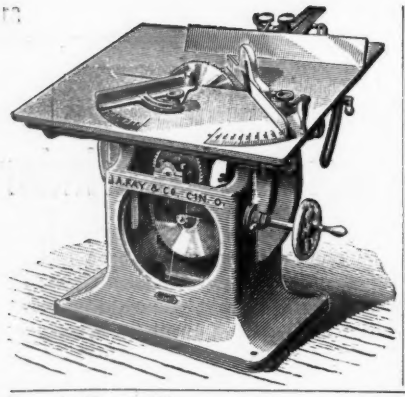

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With combined Ripping, Cross-Cutting and Beveling Table, cut of which appears herewith. When in need of machinery we trust you will permit us to hear from you.

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No. 1 Hand Planer and Jointer

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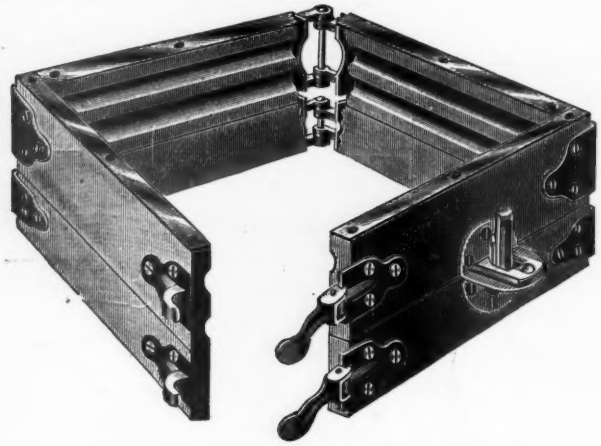
SNAP FLASKS

IN THIS COUNTRY, FOR TWO REASONS.

First—Our Flask has been found to be the best in the market and foundrymen insist upon having them, no matter who they buy of.

Second—Making them in such large quantites and using the most improved machinery enables us to sell them cheap.



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Made by skilled mechanics out of the best kiln-dried lumber and with all malleable iron fittings.

Here are our prices for standard sizes:

1 in. Natural White Wood	$2 00
1 1-2 in. " " "	2 25
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Three Part Flasks, $1 extra.

If you desire discounts, write us and mention *The Foundry*.

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Made of Ticonderoga Graphite; Better than Ceylon Lead; Better than Silver Lead; Behaves well under the Slicker; Will not wash before the metal; Adheres well to the Sand; Burns slowly so the Gases are nicely relieved.

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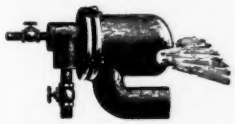

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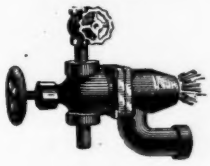

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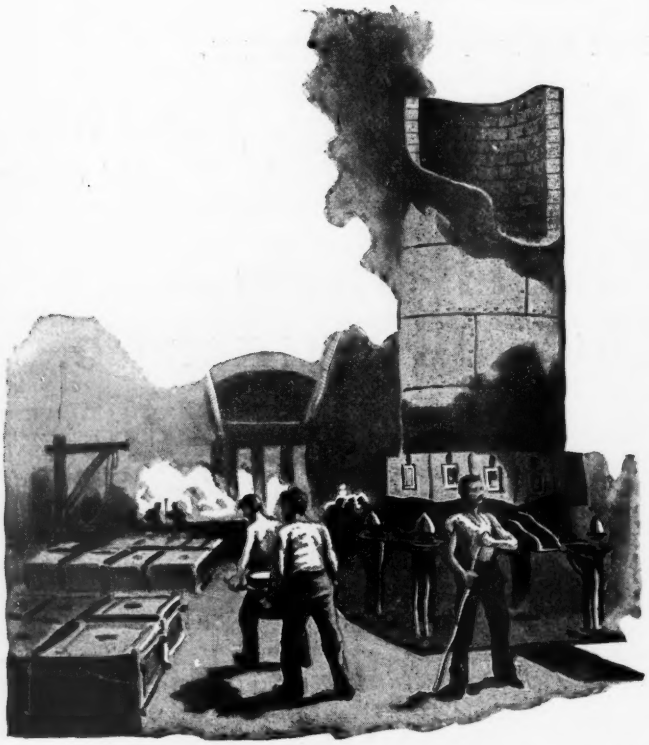
Cupolas

and while you are making this change, why not try our "WANATAH," "MCHENRY," "CENTERTON," "NEWPORT," or ALBANY Moulding Sand. **REMBMBER, We guarantee Every Article we Sell.** All we ask is a trial. When ordering do not forget that we sell **Bellows, Riddles,** Facings and all kinds of Supplies for the Foundry



Write us and mention The Foundry.

GARDEN CITY SAND CO.

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